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Logic Assumptions and Risks Framework Applied to Defence Campaign Planning and Evaluation

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ABSTRACT

This paper describes the Logic, Assumptions and Risks Framework (LARF) developed by DSTO to establish a mechanism to improve the analysis, transparency and decision paths that underpin planning and evaluation. The challenge was to develop an approach based on established theory, but tailored for Defence-specific requirements, particularly for campaign planning and assessment activities. This framework has been validated through a range of trials on critical campaign functions and has proven to be effective. Consequently, it is assessed as being well-suited to the current and future Defence decision-making environment, and is likely to continue to be applied as part of DSTO's support in these areas.

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Executive Summary

Evaluating the progress of ADF operations has come into focus recently in the Afghanistan, East Timor and Solomon Islands campaigns. In response, the Operational Planning and Evaluation Team within DSTO Operations Support Centre (DOSC) began in mid-2010 to design and implement a repeatable process for conducting campaign-level monitoring and evaluation, to support planning. The result was the development in collaboration with the Plans Branch of Headquarters Joint Operations Command (HQJOC), of the Campaign Assessment (CA) process, which includes techniques adapted from methodologies in other domains to address the challenges of evaluation in complex conflict or post-crisis contexts.

The problem for analysts in Defence is that it is difficult to assess the success of a campaign if the campaign's plan does not adequately articulate the intent, scope and expected outcomes of operational activity. Whilst all plans state objectives and various levels of goals, it is often not clear why a series of objectives is expected to lead to an overall positive outcome, or to what degree and in exactly what form a goal must be achieved to constitute 'success'. DSTO evaluation analysts consistently find that these explanations of linkage between intent and expected outcome are missing from campaign plans.

In order to address these problems, this research has three aims. The first is to identify priority information requirements, by combining insights from practical experience in CA cycles with a literature review of planning and evaluation theories. The second aim of the research is to investigate whether it is possible to develop a framework that can be applied to the CA process to draw out the information components that have been identified as priorities. The third aim of the research is to consider whether the framework developed can be applied to drafting of new plans and reviews of existing ones, so that priority information components are clearly articulated in future plans.

The research identifies that the priority information requirements for enhanced campaign-level planning and evaluation are logic, assumptions and risks. This is supported by review of several dominant theories in the disciplines of evaluation science, cognitive science, organisational psychology, and decision support engineering; namely Theory of Change, Program Evaluation and Cognitive Mapping. Each provides guidance for scientifically considering a problem, but not the actual

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techniques for applying that problem structure throughout the phases of planning and evaluation. Therefore, it is concluded that the theoretical insights require a framework for practical application, and although a large variety of frameworks and techniques have been developed by other agencies to apply these theories, none entirely meet the specific needs of Defence. Consequently a bespoke framework blending the advantages of a variety of approaches is required, and the Logic Assumptions and Risks Framework (LARF) has been developed to fill this methodological gap. The LARF provides a mechanism for systematically eliciting the logic, assumptions and risks in campaign planning and evaluation with some assurance of comprehensive consideration across all components of a plan. It then enables aggregation of those assumptions and risks and visibility of any primary risks that are common across multiple Effects, which can be highlighted and prioritised for monitoring or prevention.

Another key characteristic of the LARF is the scalability of its structure, depending on what users are aiming for and to what extent a plan or evaluation framework can be altered. Both Theory of Change and Program Theory allow for either micro- or macro-theories to be drawn out and analysed. By synthesising both of these theories into the LARF, it can be used to gain insight into either the detail of how activities and component parts of a plan are expected to work (ie. the micro-theory), or to gain insight into how the sum of the components is assumed to culminate in the achievement of some form of change (ie. macro-theory).

The LARF is assessed through trials on four critical campaign functions in three different Defence operations, and proves to be an effective tool in each instance, with a number of unexpected advantages. In summary to date, the LARF has been used as:

- an initial planning tool – to test viability of objectives, draft underlying detail of those objectives, and concept of how their achievement will be assessed;
- a group learning exercise for building situational awareness – the basis of a forum for exchange of ideas and knowledge, for experienced and inexperienced. Also served as an effective team-building exercise which revealed individual's areas of expertise, strengths and weaknesses;
- a structured format for revision of an existing plan and evaluation framework;
- a tool for generation of a set of risks and assumptions to be added as indicators to an existing set of measures of effectiveness.

These trials demonstrate that the LARF offers planners and evaluators the ability to better identify the relationships between action, results, risks and opportunities. It enables planners to be more responsive and adaptive to changes in the operating environment. By making the campaign's priorities transparent it facilitates review of efficient use of resources and increases the likelihood of detecting and responding to obstacles. It has been found to distinguish between design or implementation flaws as the reason for a lack of progress towards defined objectives (or the reason for progress); and to assist in identifying indicators and metrics for measuring progress. The adaptability of the LARF and its suitability for rapid implementation, without a significant resource liability, makes the LARF well-suited to meeting current Defence

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planning and evaluation requirements, and it is simple and practical enough to be adapted for a wide variety of future functions.

There remains significant scope for further development, validation and application of the LARF, particularly in the use of data elicited in the LARF matrix as a reference for tracking whether planning logic and assumptions were correct as part of post-operational evaluations. However, research to date has produced a practical and immediately applicable framework.

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1 Introduction

1.1 Background

Recent Australian Defence Force (ADF) operations in Afghanistan, East Timor and the Solomon Islands have highlighted that existing methods for planning, monitoring and evaluating activities in other domains are not well suited to Defence's unique requirements. Defence decision makers are required to translate Government direction into plans, to monitor progress, and to choose appropriate courses of action to maintain progress in a highly uncertain environment. In any operation, Defence is not an isolated actor, and there are many influences on the likelihood of success or failure which have nothing to do with military activities. Contributing factors and causal dynamics are not always apparent or quantifiable, making industrial planning and evaluation models of inputs, outputs and milestones inappropriate. The extent to which desired conditions are emerging in the operating environment, whether the presence of these conditions is likely to continue, and the extent to which the ADF is able to influence them, requires consideration of contextual information from the broader operating environment. Traditional Defence campaign assessments are not designed to take account of this level of contextual complexity. As a consequence, they are not able to report on progress with transparent, repeatable analysis frameworks which provide assurance that assessments are both comprehensive and evidence-based.

In recognition of this, the Operational Planning and Evaluation Team within the Defence Science and Technology Organisation's (DSTO) Operations Support Centre (DOSC) was tasked in mid-2010 to design and implement a repeatable process for conducting campaign-level monitoring and evaluation, to support planning. The result was the development and institutionalisation of the Campaign Assessment (CA) process. This included techniques adapted from methodologies in other domains to address the challenges of evaluation in complex conflict or post-crisis contexts.

The problem for analysts is that assessing the success of a campaign is problematic if the campaign's plan does not adequately articulate the intent, scope and expected outcomes of operational activity to stakeholders. Whilst all plans do state objectives and various levels of goals, it is often not clear why a series of objectives is expected to lead to an overall positive outcome, or to what degree and in exactly what form a goal must be achieved to constitute 'success'¹. These explanations of linkage between intent and expected outcome are the form of logic that DSTO evaluation analysts consistently find missing from campaign plans.

Given these problems, research was conducted to address the question of precisely what information components of a plan are of primary importance for CA? A second question that also arises is, once these priority information components are identified, how can we derive them from any existing campaign plan? In the next section, the specific aims of the research program designed to answer these questions is detailed.

¹ This concept is further discussed in Chapter 3: Literature Review.

1.2 Aims

The first aim of the research is to highlight the priority information components of a plan that enable CA. The definition of what constitutes priority information requirements will be determined by combining insights from practical experience in CA cycles² with a literature review (in Chapter 3) of planning and evaluation theories.

The second aim of the research is to investigate whether it is possible to develop a framework that can be applied to the CA process to draw out the information components that have been identified as priorities. Given that CA analysis teams have an on-going requirement for techniques for extracting a greater depth of understanding of respective campaign plans, any mechanism for rapidly identifying priority information components in large, complex plans is desirable. As discussed later, greater depth of understanding enables analysts to evaluate the plan within the appropriate context, to identify a greater number of pertinent indicators of progress, and to identify how these can be most effectively monitored (Weiss 1997).

The third and final aim of the research is to consider whether the framework developed can be applied to drafting of new plans and reviews of existing ones, so that priority information components are clearly articulated in future plans. This is intended to enhance the quality of plans in general, as well as facilitating the CA process in future.

1.3 Scope

Research to achieve these aims is best carried out within the scope of the following series of six steps:

1. Establish the requirements for the research, develop clear definitions of the main concepts and identify the constraints for the research. This will include consideration of the information gaps and information requirements in line with the first aim of identifying priority information components to enable CA.
2. Review the literature to first identify theories that identify priority information requirements for planning and evaluation to contribute to the first aim and second, to identify hypothesised techniques for eliciting and analysing these information requirements. The step will support achievement of the second aim.
3. Develop a proposed solution that synthesises theoretical constructs and practical considerations. Building upon the previous step in which the viability of a framework as a solution is considered, this step will achieve the second aim by creating a single framework which is optimised for Defence operational requirements.
4. Test the proposed framework through trial applications in a range of real-time operational planning and evaluation tasks. This step will consolidate achievement of the second aim, through analysis of the benefits and weaknesses of the framework revealed by the trials. It will also support the third aim by considering the applicability of the framework to planning processes by including trials on planning activities. From this we are able to draw conclusions on the viability of the research and the need for further development or testing of the framework.

² Evidence and discussion of all CA cycles to date are contained in classified DSTO reports on support to operations in Afghanistan, East Timor and The Solomon Islands, which can not be referenced here. However, they will be described in generic terms in case studies under Chapter 5.

5. Integrate trial findings into further research and development. Identify additional trial applications and formal validation (including capturing user feedback).
6. Finalise the framework through endorsed integration into Defence guidance documents and user education programs.

1.4 Report Structure

Chapter 1 is this chapter. In Chapter 2 we will establish a clear explanation of the research context, by defining and discussing key elements, characteristics and constraints of the problem context. Chapter 2 is the result of Step 1 of the scope of the research. Chapter 3, the literature review, will highlight the main theories that are relevant to the research problem and represents Step 2 of the research). The strengths and weakness of each of the theories is identified and a summary of the main points relating to the research is presented (Step 3). Chapter 4 continues with a description of the method for developing a Defence-tailored framework (Step 3). The research method used to develop and trial the framework is then presented. This will include the criteria for rating the success of trials (Step 4.) Chapter 5 (as part of Step 4), will provide descriptions of a number of situations in which the framework was used. The results from these use-cases will then be discussed. Chapter 6 reflects on the implications of these findings for further development of the framework. Finally, Chapter 7 will draw conclusions on the extent to which the research aims have been met. Indications from the research to date about the viability of the framework will be identified. This final Chapter will document the completion of Step 4, and will identify future research, (Steps 5 and 6).

1.5 Conclusion

This chapter has explained the origin of the DSTO's support to Australian Defence operational-level planning and evaluation, and highlighted some of the persistent challenges faced in providing analytical support to these tasks. Investigating options to overcome these challenges has become the aim of a research team within Operational Planning and Evaluation Team, and has led to the development of the framework described in the remainder of this report. In the next chapter we will explore the operational domain that shaped the research, by providing definitions of key aspects and the constraints of the context of application.

2 Operational Domain

The previous chapter described the background in which the requirement for the DSTO's research and support emerged, and the improvements that this research aims to make. This chapter will further define the context of the task to enable a more detailed discussion and understanding of the boundaries of the research team's contribution. To do this, we will first define the key components of Campaign Plans and Campaign Assessment, identifying the current limitations and implications of each for analysts. We will then consider the practical constraints pertaining to the Defence operational context of application. These constraints will

form the basis for the criteria set out in Chapter 4 for assessing the Defence-specific practicality of research outcomes.

2.1 Campaign Plans

As a long-term planning instrument, campaign plans are designed to articulate Defence's intended contribution to a Government initiative, and translate this intent into a cohesive program of military activity that will align with Government strategy from start to finish. In a Whole of Government context, the campaign plan can be thought of as a program planning structure in which the military component of national strategic objectives is defined, and this strategic military component is broken down into broad Decisive Conditions.

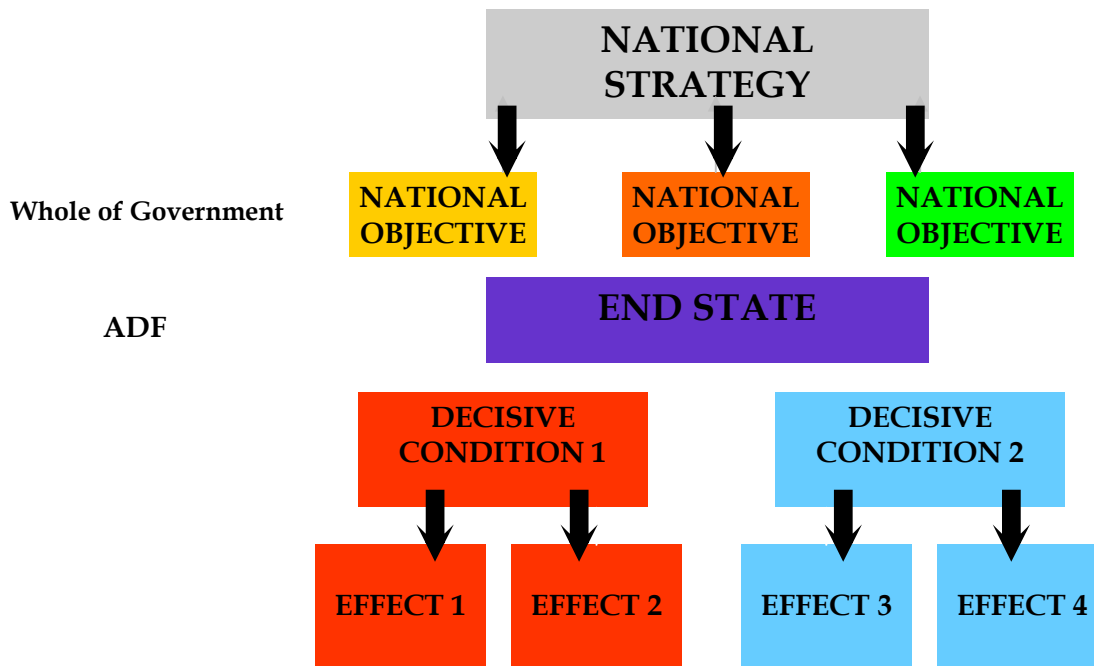


Figure 1: Example of an ADF Campaign Plan mapped hierarchically from National Strategy, to the ADF End State, to Decisive Conditions and downwards to Effects

Figure 1 shows that ADF campaign plan Decisive Conditions are comprised of high-level objectives which in turn, are broken down into actionable Effects (or progress milestones) that will lead to the achievement of those objectives. Effects define the boundaries for the range of activities that the Commander Joint Operations (CJOPS) plans to undertake and describes the scope of influence he expects to have in the area of operations (Hickman 2012). It is important to note that Effects are written as outcomes rather than actions, and they each describe a condition or change in condition which is expected to be achieved by associated tasks and activities. In this way, an Effects-based military campaign is what Williams and Morris (2009) define as a sequence of hypotheses, referred to in evaluation practice as a normative program theory, or theory of change.

The quality and longevity of a plan is contingent on articulation of clear links between the elements of the hierarchy. The comprehensiveness and cohesiveness of a campaign plan is

demonstrated by the extent to which the ultimate Effects can be aggregated upwards to logically lead to the emergence of the Decisive Conditions, which can subsequently be clearly understood to be pre-conditions for achievement of the ADF End State. The extent to which these linkages should be detailed in campaign plans is not prescribed by Defence doctrine. However, for the purpose of this research, they are considered to be priority information requirements for planning and CA, and will be referred to in further discussion as 'logic', 'assumptions' and 'risks'.

The DSTO team's exposure to campaign planning and CA since 2010³ has indicated that the logic for embarking on a given course of action is often assumed to be self-evident, and the planner's perception of the operating environment is assumed to be accurate and enduring. However, as the global history of program failures and unsuccessful military operations have demonstrated⁴, both logic and assumptions can be flawed, or at the very least need to be revised to align with an evolving reality. Without articulation of logical links, the plan cannot be accurately interpreted into action. Without articulated logic and assumptions as a reference point, plans cannot be modified in response to shifts in the complex operating environment, without risk of losing alignment with original intent and national strategy. In this instance, it also becomes difficult to identify indicators of progress along, or divergences from, intended paths, when those paths are not clearly articulated. This is a significant obstacle for effective evaluation.

Lack of articulated logic and assumptions has been a significant issue during the DSTO's support to drafting and updating of campaign plans. During these planning forums, divergence in the perspectives of various planning staff became difficult to resolve if underlying logic and assumptions were not surfaced and addressed. It is also evident that entire plans can be developed, based on a set of assumptions that are never articulated. This significantly impacts upon the degree to which the intent of the plan is accurately understood, and translated into appropriate operational action.

2.2 Campaign Assessment

Campaign Assessment (CA) is the means by which the ADF is able to review progress towards the goals defined in a campaign plan. Progress is defined in terms of likelihood of success, as well as resources and time required for success. Assessments are made at regular

³ To date, this comprises more than eight CA cycles and planning reviews for Op SLIPPER (Afghanistan), Op ASTUTE (East Timor) and Op ANODE (The Solomon Islands), in addition to the plan drafting process for a non operational Regional-engagement campaign plan. References for these reports are Classified.

⁴ Examples include those detailed in: K. Betts "Analysis, War and Decision: Why Intelligence failures are inevitable", in *World Politics*, Princeton University Press, 1978; T. McConville, "The War on Terrorism: A New Classic in Groupthink", in *Defence Management in Uncertain Times*, Cranfield Management Series No. 3, USA, 2003; F. Sheils, "Prevantable Disasters: Why Governments Fail", Rowman and Littlefield Publishers Inc, USA, 1991; E. Larson, D. Orletsky and K. Leuschner, "Defense Planning in a Decade of Change", RAND Project Airforce, 2001; S. Casey and J Wright (eds) "Mental Maps in the Era of Two World Wars", Palgrave Macmillan, 2008; United States General Accounting Office "Foreign Assistance: Observations on Post-Conflict Assistance in Bosnia, Kosovo and Afghanistan" GAO-03-980T, July 2003.

intervals (i.e. quarterly or bi-annually) comparing actual progress with intended progress (i.e. time, resources and milestones set out in the plan). The reliability and insights of reports generated through CA process developed by the DSTO has resulted in the institutionalisation of the process as part of HQJOC planning, decision-making and senior command advice.

Specifically, the DSTO's support to the CA process is intended to assist decision makers at all levels to:

- maintain visibility of whether the original Commander's intent is being sustained;
- identify whether resources are being put to best effect (i.e. whether gains are being built upon, and where less effective activities can be discontinued); and
- where necessary, adapt initial plans and goals to align with changes in the environment.

CA must look beyond ADF inputs and outputs, and cannot be conducted by simply reviewing the performance of the ADF on operations in order to make assessments of actual progress towards Decisive Conditions, as defined in DSTO guidance on support to campaign assessment (Hickman 2012). This requires the construction of a rich picture which incorporates as many contextual variables as possible, including the influence of all non-ADF players in the operational space. This has been achieved by incorporating elements of civilian evaluation practice, into the CA process, to move it beyond simple battle damage assessments, and ensure that the analysis contained in a CA is verified with as much evidence as possible, and is a reliable source of situational awareness for senior ADF decision makers.

As will be discussed as part of the literature review in the next chapter, many of the civilian approaches to planning and evaluation require visibility and analysis of underlying logic, the assumptions upon which that logic is based, and the risks identified and accepted within the plan. Surfacing of the logic, assumptions and risks of campaign plans is essential for analysts to recognise what variables and evidence are pertinent to making credible assessments. Our experience in successive CA cycles⁵ has been that while they have highlighted some of these information elements, for some components of the campaign, their consideration has been random and inconsistent, rather than by design. There has been no consistent mechanism for identifying the logic and assumptions of a plan, or for monitoring whether they are flawed and are putting the plan at risk. CAs have instead focused on measuring positive or negative indicators of progress.

The veracity of a plan can only be analysed if it's underpinning logic, assumptions and risks are transparent, and can be compared with emerging reality. Indicators of success or failure are valuable for reporting on progress trends to date, but are of less value for providing assurance of why current trends should, or shouldn't, be expected to continue. Assessments of what is likely to happen in future must be aligned with the assumptions of the campaign plan. It is these assessments that are of greatest value in informing decisions on what action should be taken next. Therefore, when seeking to produce CAs that assist decision makers in the

⁵ Evidence and discussion of all CA cycles to date are contained in classified DSTO Technical Reports on support to operations in Afghanistan, East Timor and The Solomon Islands, which can not be referenced here. However, they will be described in generic terms in case studies under Chapter 5.

ways listed above, assessments still need to report on progress trends to date, but those trends must be analysed in terms of what they mean for the veracity of the plan going forward.

This is not to suggest that all initial plans are flawed, but rather recognises that in a complex environment that involves highly variable inputs, it should be expected that the logic and assumptions upon which initial plans were based will need to be corrected as the operating environment evolves. Defence operations occur within an environment where multiple actors, timeframes, priorities, and mechanisms for pursuing a course of action, all intersect, and no aspect of the environment can be expected to be static. Therefore, planning must be iterative and responsive, and CAs must be able to inform iterative planning by including systematic consideration of the veracity of the plan's logic, assumptions and identified risks, in light of emerging evidence.

2.3 Practical constraints

As suggested in Section 1.1, Defence has a number of unique characteristics that limit the applicability of existing techniques for monitoring and evaluation from other domains such as industry and development agencies. These characteristics serve as constraints on the options for practical research outcomes, and these are briefly described now. There are four major practical constraints: ADF resource limitations, the complexity of campaign environments, data collection limitations and requirements of decision makers. These constraints are described in more detail in the following paragraphs.

The first constraint is the lack of ADF resources to dedicate to any component of campaign planning and evaluation. In contrast some other international agencies or corporations in Australia and overseas, the ADF does not have a large team dedicated exclusively to conducting program-level evaluations, and interfacing with planning staff. As a result, any practical addition to ADF planning and evaluation processes must require a minimum of staff and time investment. As will be elaborated on in Chapter 3, many existing program planning frameworks require a sizeable planning team to conduct detailed investigations as inputs to the process. Whilst the commitment of this scale of resources for a rigorous and comprehensive planning process is desirable, it is not within the capacity or timeframes of the current ADF operational planning structure.

Secondly, as already highlighted in the definition of CA, a solution is sought that is applicable in the ADF's complex operating environments, characterised by high degrees of uncertainty. There is potential in the Defence context for action to be paralysed by uncertainty. Whilst planning of action and assessment of the likelihood of success is undoubtedly enhanced by greater degrees of contextual understanding, there must be a limit to the time and resources expended on establishing this understanding prior to acting. Therefore, an appropriate solution must not be dependent on certainty about the variable of the context within which the plan will be executed, such as inputs, outputs, and tangible goals. Again as already suggested under the definition of CA above, in such uncertainty, decisions will be iterative and emergent, and will require planning and evaluation tools that are repeatable and equally adaptive.

A third constraint is the likelihood of gathering data for planning or evaluation in an environment which is subject to conflict or crisis; referred to as a *non-permissive environment* by the ADF. The likelihood of operating in a non-permissive environment significantly constrains the practicality of conducting consultation with stakeholders, and target populations of a plan, to determine goals and identify how these goals will be achieved and evaluated. When operating in environments where there may be adversaries, or where there is potential for the situation to deteriorate if some forms of information are made available, the scope for collaboration and consultation is limited. It also often means that planning is being conducted in response to a crisis, with a short lead time for consultation and information gathering. This is contrary to a large portion of existing techniques for enhancing planning and evaluation, which advocate participative research (Van der Riet 2001) and collaborative evaluation wherever possible. Again, while the merits of high degrees of consultation and local participation are acknowledged, this requires longer timeframes and levels of engagement that are not currently considered viable for military operations in post-crisis or conflict environments.

The time constraints of carrying out research concurrently with executing actual CA and planning tasks, meant that research commenced without a series of activities dedicated to elicitation of client requirements, engagement of the client in formal needs elicitation programs, or dedication of time and resources to a scoping study. This decision is reinforced by the fact that the research follows several years of work within the problem domain, from which it is believed sufficient understanding has already been established.

Finally, given that the ADF is operating in response to political guidance, decisions on operational direction and scale may be already set by the time that planners or evaluators are directed to devise a way forward. Therefore, it is often likely that there will be constraints on the level of planning or evaluation sought in the operational context. Techniques designed to focus on 'greenfield' scoping of solutions and strategies may waste significant time analysing factors which are not changeable within the Defence context.

These practical constraints form the basis of a set of criteria that will be listed in Chapter 4, for testing the practicality of the framework developed here, which is considered an important component of assessing the extent to which overall research aims have been met.

2.4 Conclusion

This chapter has defined the context within which research is being conducted. It is apparent that Defence campaign planning combines the well established ADF operational planning process with the evolving mechanisms for translating Government strategic intent into Defence objectives and effects. This context has some similarities with all program-level planning, including the requirement for visibility of a plan's logic, assumptions and risks for analysts to recognise what variables and evidence are pertinent to making credible assessments. It is also apparent that the research context has many unique constraints that are problematic for the provision of scientific analysis support to campaign planning and evaluation of plans. As highlighted, one of the implications of time, data and resource constraints is the lack of a consistent mechanism for identifying the logic and assumptions of a plan, or for monitoring whether they are flawed and are putting the plan at risk. The other

constraint expected to impact upon the research is variation in the degree of influence or change sought from planning and evaluation support, depending on the level of maturity and endorsement of a plan. The design and testing of research outcomes can now be understood within the constraints of the intended context of application. This concept of what is likely to be relevant and beneficial in practice will be used to assess the potential applicability of a number of theoretical approaches in the next chapter.

3 Literature Review

The previous chapter focused on the Defence context in which the research is situated. This chapter will turn the focus outwards, looking broadly at the theoretical constructs and methods that have been applied outside of Defence to achieve similar aims. In particular, this literature review will show how the information elements of logic, assumptions and risks are elicited and analysed under several dominant theories in the disciplines of evaluation science, cognitive science, organisational psychology, and decision support engineering. These existing theories have potential to provide problem structures and analysis steps that would add transparency to the campaign planning process and provide insights upon which more effective evaluation could be based. The review of theoretical literature is concluded with a synthesis of theories in Section 3.5, which describes the implications of each for planning and evaluation. The review begins by considering the theoretical guidance that underpins all ADF activities (contained in current Defence doctrine pertaining to operational planning and evaluation).

3.1 ADF Doctrine

There are currently several editions of ADF doctrine that pertain to operational planning and evaluation⁶. They aim to provide the process tools to overcome the kind of uncertainty and complexity described in the previous chapter as characterising the Defence operating environment. However, there are several important limitations to the extent to which ADF doctrine provides guidance for CA. For example, there is a lack of consistent definitions between different doctrine publications. There is also a lack of detail and illustrative example in guidance intended to cover the campaign level, which has resulted in Defence planners interpreting the doctrine in different ways when developing campaign plans for recent ADF operations.

Comparison of campaign plans for different operations reveals that there is little similarity between plans in terms of how the operational logic has been charted, how the assumptions of the operation have been revealed and tested, or how the measures of operational progress have been developed. This has been problematic for the development of a consistent approach to effective assessment of campaign progress and effectiveness. This was improved to some extent, very recently with a new version of Australian Defence Doctrine Publication 3.0, Campaigns and Operations, released in mid 2012. However, definitions and descriptions of

⁶ Australian Defence Doctrine Publication 5.0, Joint Planning (Provisional), January 2006; and Australian Defence Doctrine Publication 3.0, Campaigns and Operations, July 2012; Australian Defence Doctrine Publication 00.4—Operational Evaluation, August 2007.

planning and evaluation processes are still not clearly aligned with what can be seen to occur in practice. Of most relevance for our research, doctrinal guidance does not, and is not intended to, provide detail on optimal techniques for accomplishing the respective steps defined for planning or evaluation. Therefore, it was concluded that doctrine directs (albeit inconsistently) *what* needs to be done, and the development of concepts on *how* things are to be done must be drawn from other sources.

3.2 Theory of Change

Theory-based evaluation frameworks, usually referred to as Theory of Change (ToC), aim to evaluate the action undertaken as part of the program, simultaneously with the theory upon which those actions and decisions were based. As highlighted by Bickman (1987):

All too often evaluators focus on the technical aspects of the evaluation process (design and measurement) and pay scant attention to the program. A successful evaluation can produce some short-term results and possibly local change, but without considering the theory underlying the program, neither evaluators, program developers, nor program implementers can hope to produce generalizable findings. The ability to generalize from a specific evaluation is significant for policy makers. They need to know whether the results of a particular program indicate that the program or some aspects of the program will work in some other setting and time.

Rather than listing or quantifying desirable outcomes, theory-based impact evaluations produce a narrative theory of the change which offers insights into why a program is executed in a given manner, and subsequently, why it either generated or did not generate the anticipated outcomes (Weiss 1997). It also seeks to provide answers as to what extent external factors contributed to these effects, and what led to the unanticipated effects which were observed. These insights suggest what remediation action should be taken to correct or reinforce trends in an on-going operation, whilst also showing what trends are context-specific, and therefore should not be expected to be replicated in the future.

All plans, programs and activities contain ToCs, and associated assumptions about how and why action will bring about change. One does not have to apply a ToC approach to create such a rationale, because all actions are undertaken with some concept of what they are expected to achieve and how. However, as Leeuw and Vaessen (2009) point out, that rationale may be either explicit or implied. Application of ToC simply ensures that planners explicitly articulate their intentions, expectations and assumptions, rather than focusing only on what will be done and when. ToC is not a prescribed set of steps, or methodology, but rather what Van Stolk (2011) refers to as a way of thinking that prompts planners to ask certain questions and requires the articulation of answers in a certain way. This is a valuable insight for the intent of problem structures and analysis techniques sought by this research.

When a ToC is made explicit it is able to be tested against the realities of the area of operations, and revised as necessary. As Figure 2 illustrates, if plans are limited to listing tangible actions and roles, and do not articulate the logic, assumptions and links between them, (represented by the coloured portions of Figure 2), then there are a number of critical functions that cannot be effectively carried out. This may not prevent the execution of a plan, but it is likely that it will be carried out with misinterpretations and inconsistencies emerging

as the plan is translated into tasks. By considering campaign plans through ToC lens, we are now able to identify a set of critical campaign functions that will be potentially enhanced by the illumination of a plan's logic and assumption linkages. For example, it is also very difficult to evaluate the extent to which a plan is progressing along the path to success, if that path is not described. Further, if a plan is not delivering expected results, it is very difficult to pinpoint where corrections should be made, or to learn lessons, if the logic and assumptions that led to error or failure are not transparent.

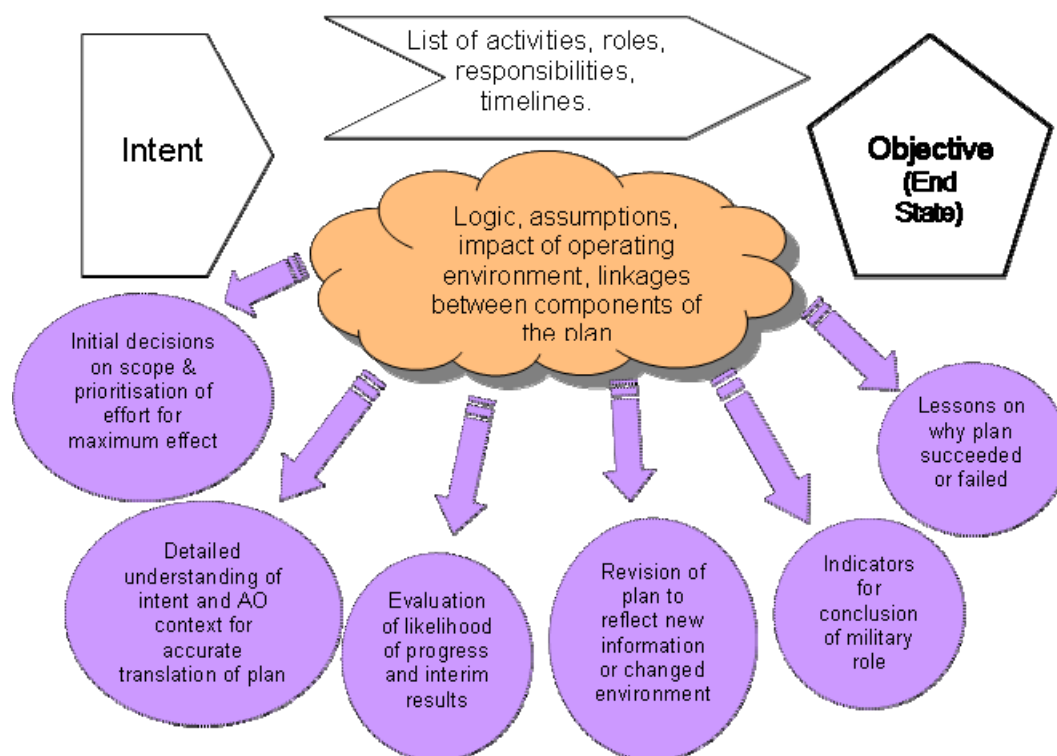


Figure 2: Illustration of the necessity for articulating logic and assumptions in a plan

Chapter 5 explores how four of these critical campaign functions can be enhanced by trial application of a logic, assumptions and risks framework.

3.2.1 Variations of Theory of Change

In military operations research, the ToC represents the rationale for how operational activities (in combination with other factors) will result in desired outcomes as described in the campaign objectives and end state. The inclusion of ToC in campaign-level planning offers transparency and clarity in the planning process, as well as strong indicators of success or failure, as observed by the UK Ministry of Defence's Development, Concepts and Doctrine Centre (Couzens 2010):

It is only when ideas have been put into words that flaws in logic become apparent and when misunderstandings between planning team members or the planning staff, commanders and the rest of the staff are revealed.

The UK Ministry of Defence's Joint Doctrine Note on Assessment (2012) refers to it as a 'road-map' to the desired condition, which should:

- Identify the overall aim;
- Set out the inputs, processes and outputs required to achieve that aim;
- Describe the logic that underpins the solution, explaining how and why the proposed actions will change a situation.

However, Australia's Office of Aid Effectiveness (Dart 2011) warns that a ToC must capture more than just inputs and outputs, to fully account for how and why a program will bring about change. The Care International UK (2012) agrees:

a well-articulated theory of change represents a testable hypothesis regarding how the planned activities will contribute to achieving the desired results for the programme... Every action we take, from the overall goal of the project to each single activity, has a theory of change behind it

Therefore ToCs can be both macro and micro. At the macro level the ToC represents a generalised understanding of how change occurs (the causal logic) and thus identifies the mechanisms to focus on in order to achieve an overall effect (Couzens 2010). This has been expressed in British military campaign assessment guidance (Development Concepts and Doctrine Centre DCDC 2012) as the commander's 'big idea' of how to bring the situation from the current undesired one to the future desired state. Micro ToC can focus on the changes a program intends to bring about, taking account of the interplay between specific intended actions and the program's context. Alternatively, Couzens differentiates these two levels as top-down and bottom-up. He refers to macro ToC applied to the design and implementation of a program, by nominating where it is located within the spectrum of strategic options, or "archetypes of change", from where the lower-level details of how the TOC can be derived. Micro ToC, is described as a bottom-up process of articulating how change will occur by linking actions to context and consequence from the bottom upwards.

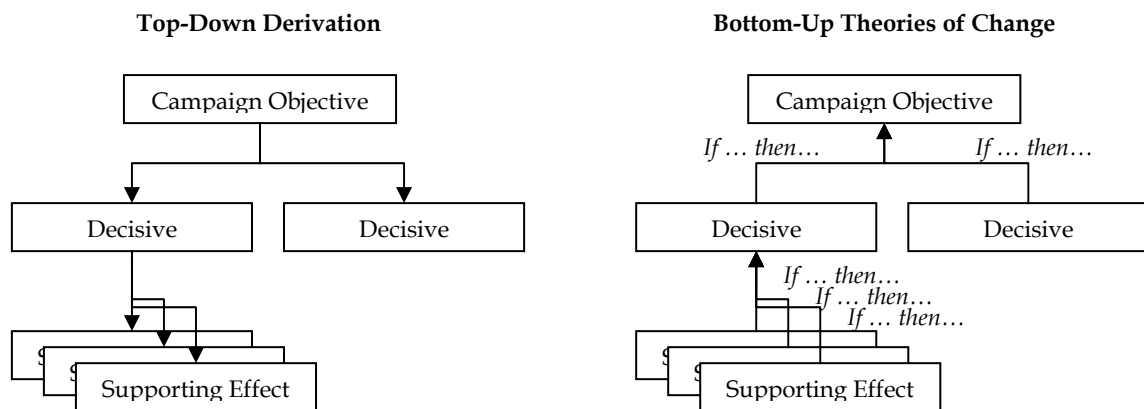


Figure 3: A demonstration of how the inclusion of theories of change which link Effects to Decisive Conditions can add robustness to campaign planning (Couzens 2010)

3.2.2 Potential for application

The ToC approach provides a problem structure and theoretical vocabulary for a form of problem analysis that is already occurring as part of DSTO's support to CA. To date it has been occurring as small, incomplete thought chains and analysis steps as part of a largely ad hoc process. By recognising these analysis steps as ToC, we can apply them in a more deliberate, systematic manner, cognisant of when they should be commenced and ensuring that they are carried out to completion, so that full benefit is derived from them. It is concluded that the suitability of either macro or micro ToC approach for our purposes is dictated by the resources and drivers for a program, and whether ToC is being applied at the planning stage, or later as part of an evaluation phase. For example, if resource or time constraints are key drivers, then micro ToC is more likely to be useful, because it is consideration of *what we are able to do* that is more likely to determine goals, and subsequently determine the scope of the campaign objective. However, if the driver of a program is the achievement of a priority objective that is considered to be critical to strategic interests at any cost, then a macro ToC will be more applicable, starting with consideration of *what we want to achieve*.

The maturity of the plan will also impact upon the choice of macro or micro ToC. For a mature plan which is already underway, planners are less likely to be seeking to revise high-level objectives, but may be willing to alter some Effects and activities; therefore, the top-down macro ToC is likely to be more useful. Where ToC is being applied at the initial planning phase, there may be more appetite to take a bottom-up approach, where the 'art of the possible' and consideration of the detail of the operating environment determines the scope of what a program aspires to. Therefore a micro ToC will enable discussion of a program of desirable activities and articulation of their expected Effects, the subsequent conditions that those effects are assumed to create, and finally the objective that will be achievable.

There are a variety of applications for DSTO's support to ADF campaign planning and evaluation, which span the spectrum of phases described above, so it can be concluded that either micro or macro ToC would be applicable at different times. As a consequence, it becomes clear that if ToC is to be incorporated into a Defence-tailored framework, it must be in a form that is adaptable to allow either macro or micro ToC to be explored. This conclusion is echoed in program theory literature, below, which discusses the requirement for both micro- and macro- program theories, and again under different scenarios for framework application in Chapter 5 below.

For Defence's planning and evaluation purposes, theory of change is valuable for determining and documenting *what* is expected to be achieved, and goes part of the way to identifying *how* those achievements are expected to come about. However, it does not systematically provide enough detail on *how* goals will be achieved, particularly in terms of assumptions about intangible consequences of action. The absence of this level of detail reduces the potential comprehensiveness of any set of indicators of change derived from ToC. ToC approaches also do not automatically lead to sequencing of activities in a form that enables planners to combine categories of effort or take account of interdependencies. Progressing to this level of detail is necessary to define specific triggers of *when* activities should start or end (also

referred to as Decisive Points), and to become aware of contradictions between courses of action and the risks that need to be monitored throughout the life of the plan.

3.3 Program Theory

Once a theory (or theories) of change is established, the mechanisms for execution and evaluation need to be established. Program theory is defined by Funnell and Rogers (2011) as an approach that brings together ToC with a theory of action to provide a cohesive plan explaining how, when and why change is intended to come about. Similar to ToC, the value of this theory does not lie in creating something that would not otherwise exist – a plan will always comprise some sort of intended change, and a series of actions that are anticipated to achieve that change. The value of program theory is the way in which it prompts the articulation and systematic consideration of intents and actions.

The formal history of this theory stems from 1960's America, when the government began investing huge sums in large-scale social development programs. There was no precedent for effective and transparent design of these programs, and no ability to evaluate the extent to which they were delivering on intended outcomes. Suchman (1967) is attributed with authoring the first guidance on program level evaluative research. This was progressed during the following decade by researchers such as Weiss (1972) who emphasised the role of evaluation concepts in program planning, and pointed to the necessity for evaluation practice in the formulation of 'program goals'. She also touched upon the concept of complex programs as systems that may have 'unanticipated consequences', and depicted program components and causal chains in flow charts. By the 1980s the term 'program theory' was well established with a variety of definitions, but with the central theme of a model of how a program is supposed to work, to provide the basis for implementation and evaluation (Bickman 1987).

Development of a program theory involves mapping out the mechanisms for change and assumptions, and defining these as the logic that underpins a program. A complete program theory is comprised of two elements: a theory of change (as discussed above) and a theory of action. Together, a theory of change and a theory of action will account for how and why change is intended to come about. The theory of action is the linkages between elements of the logic of the plan, and explains how action will produce desired results. When articulated in narrative format, a program theory comprising both a theory of change and a theory of action can be thought of as: "If x happens then y will result because x is a precursor to y ." Using program theory enables greater inclusion of the context of the operating environment, and the effects caused by outside influences: "If x happens then y will result because x is a precursor to y so long as p does not occur in the operating environment."

The inclusion of program theory in planning and evaluation enables the development of indicators which will monitor the plan's logic, not just its outcomes. This means that planners become aware of when their plan is not leading to expected outcomes, and its assumptions and logic may need to be reconsidered. It is the synthesis of technological and methodological expertise with subject-matter expertise which characterises program theory and its role in planning and evaluation (Williams and Morris 2009). When used in evaluation, program theory enables greater testing of whether a failure to achieve intended outcomes was due to

faulty theory of how to achieve the outcomes, or faulty implementation of the program itself. Bickman (1987) explains this in a different way:

In the parlance of experimentation, the program is an operationalisation of the construct or concept underlying the program. Conceptualizing the program as a complex set of independent variables that refer to a broader and even more complex set of variables (the construct) demonstrates the relevance of program theory to construct generalization. Without being able to specify these theory elements, it cannot be determined if a particular program is a valid operationalisation of the theory underlying the program [and whether]... the particular program is a good representation of the theory.

3.3.1 Variations of Program Theory

When articulated in narrative format, a Program Theory comprising both a theory of change and a theory of action can provide a detailed articulation of understanding of the anticipated program from start to finish. It can situate a theory of action within a defined program space, with discussion of the logic or theory of change, upon which the program has been defined. Further, a narrative program theory will step through layers of logic and corresponding action, giving opportunity to draw out how the broader context within which the program occurs, is expected to impact on progress. These broader context variables are referred to by Funnell and Rogers (2011) as “non-program external factors”. However, some program theorists, such as Scheirer (1987) draw a sharp distinction between program theory and implementation theory, insisting that program theory should be limited to an initial theory of change, which is later translated into, and used to evaluate, a plan of action. This form of Program Theory is sometimes referred to as ‘program philosophy’, emphasising that it encompasses a “system of theories” which “comes before the physical and behavioural manifestations of the program” (Conrad and Miller 1987). For the requirements of this research, including its immediate application to extant planning, it was considered more useful to apply a form of Program Theory that does not exclude analysis of detailed structures of action, giving the flexibility to consider either intent or action as required. Similar to micro- and macro- ToC, discussed above, two tiers of program theory can be defined as follows:

- Program micro-theory – describes structural and operational aspects in detail with information on functions and variables. This identifies components that can be changed when it is evident that the program as a whole cannot be changed.
- Program macro-theory – describes the large-scale components and factors that facilitate or constrain change within and outside programs (Shadish 1987).

Program Theory is also commonly expressed in various diagrammatic forms, which are also referred to as logic models. As shown in the example at Figure 4 below, these are basically variations on flow diagrams that visualise greater or lesser degrees of information, about the linkages between the overall program objectives, and how these are categorised and broken down into sub-components. While the degree of detail on sub-components in these logic models may vary, all logic models must at least depict the entire top level of a program. The form of the model can shape the points of emphasis for a program, such as whether much of the high-level rationale for the program is pre-determined, so the focus of the model is on translating that high-level guidance into achievable goals and specific actions. Alternatively, some logic models provide more space for illustration of the range of activities that already

exist or are considered possible, and then allow for extrapolation upwards to form an overarching program.

The desired format and points of emphasis of a program theory model will depend on its context of application. For example, as Bickman (1987) observes, “a psychologist may prefer to develop a program theory using individual cognitions and attitudes as a basis, while a sociologist may prefer to use roles and organizational variables. An economist will probably be most comfortable using a microeconomic theory”.

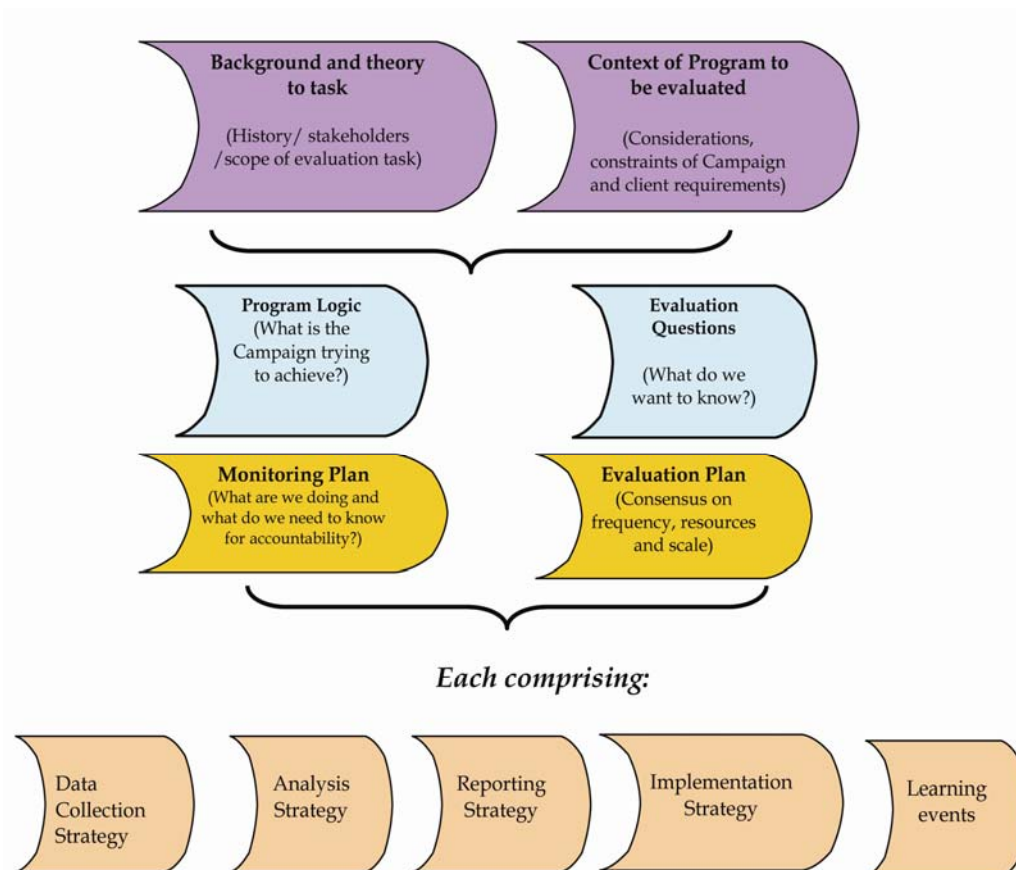


Figure 4: Example of Program Theory model applied to an evaluation plan (Hickman 2012)

A Program Theory should demonstrate logical and defensible linkages between activities and outcomes. However, as Funnell and Rogers (2011) point out, applying Program Theory and creating a model of linkages, does not guarantee that those linkages are robust or correct and enduring. It is possible to build a Program Theory model of activities and outcomes that does not reflect reality, or even likely capability or consequence. There are many variations on flaws in Program Theory models, such as⁷:

- A Program Theory model that comprises actions that are partial steps towards success, but not sufficient to achieve an outcome; (e.g. assuming that proving a target group with information about health will be sufficient to achieve improved health outcomes)

⁷ Partially derived from Funnell and Rogers (2011), Pg 43- 52.

- A comprehensive Program Theory model that solves the wrong problem. This is often a result of incorrect assumptions about the causal factors for a given situation; (e.g. seeking to establish stability in a conflict-affected community by re-establishing governance and law and order institutions that have broken down, but failing to address communal inter-group grievances)
- A program model that oversimplifies causal chains, and is not based upon adequate situation analysis. This is often the result of inadequate effort devoted to establishing an accurate baseline of the factors we are seeking to change and often manifests unintended consequences, or lack of impact; (e.g. an agricultural efficiency development program model may require levels of local participation and recourses that are not available, or may be executed, without awareness of consequences for local employment or social structures)
- Excessive or insufficient consideration of intended outcomes. Excessive focus on outcomes can lead to program goals that are too prescriptive, or too low level, and fail to consider longer term or cumulative effects. Insufficient consideration of goals can result from a focus on participating in a particular activity, and this participation, or the use certain techniques or assets, becomes the goal. In turn, measures of success become lists of activities, or quantitative inputs and outputs, rather than indicators of the actual impact of those activities. (e.g. the success or failure of a crime prevention initiative may not be recognised if based on prescriptive targets of reduction in particular crime statistics in a certain timeframe. Similarly, if overall desired effects are not well defined as part of a crime prevention program model, evaluation may be limited to reporting on numbers of participants in focus groups, or percentage of uptake on rehabilitation courses).

3.3.2 Potential for application

Program Theory is consistent with the intent of DSTO's support to operational planning and evaluation, which is to render explicit the chain of logic that underpins a program of activities, so that appropriate actions and indicators of progress can be identified. Program Theory provides a planning structure which is ideal for this kind of transparency and evaluation. However, within the Defence context of application, it has a number of limitations that warrant adaptation.

Program Theory is most effective when applied at the initial planning phase of a program. When applying it to an existing plan, it may be found that some elements of the model do not exist, and the process for retro-fitting them may not be desirable at a given point in time. As demonstrated in the examples of application described in Chapter 5, the research team has found that this is often the case in the Defence strategic-level planning context, where support for planning or evaluation is requested after a plan is well advanced, or even already being executed. It is more common that support to planning is requested during reviews and re-drafts of extant plans. In this instance by converting the plan into a Program Theory model, it would be possible to take a more structured, systematic approach by reviewing each of the program components and having transparency in the impact of alterations of one component of the plan on other components. It would also prompt consideration of whether the plan is subject to any of the flaws that Program Theory warns against. However, the concept of

converting an established plan into a program theory model is likely to be rejected as requiring excessive time and staff inputs for Defence's very tight operational decision-cycles.

For ADF operational planning and evaluation, there is also a pattern of reluctance to direct program evaluations or reviews at the strategic guidance level. Being a Government department, Defence's role is to focus on the ways in which it can contribute to strategic requirements, rather than questioning or re-shaping those requirements. This demands an approach that examines a program's logic, assumptions and risks, like Program Theory, but in a more scalable (ie. rapid or lengthy, high or lower level) form.

3.4 Cognitive and Causal Mapping

Another theoretical approach which aims to make explicit the intent and logic of activities or behaviour, is cognitive and causal mapping. The quality of a program or operation is directly linked to the extent to which all stakeholders share an understanding of its intent and logic (explicit and implicit). In military terms, it has been observed by Bryant, Blais and Baranski (2008) that "Ultimately, shared implicit intent is the most important aspect of command and the key determinant of success in an operation." Having visibility of the mental model behind a plan enables subordinate commanders to decide upon action that is consistent with original intent, and also enables assessment of whether there has been, or is likely to be, progress towards intended goals.

The term cognitive mapping is said to have first been used by Tolman (1948) for a psychology paper entitled "Cognitive Maps in Rats and Men". However, it was not until the 1980s that the concept expanded from cognitive science into wider social science and operations research (Eden 1988). Cognitive mapping is a representation of a network of how an individual thinks about a particular set of issues. Causal mapping is the same process applied to a group's thinking. Most simply defined by Bryson, Ackermann, Eden and Finn (Bryson 2004):

Maps allow exploration of issues and answers through assisting and clarifying the content and logic embedded in discussion and dialogue. Indeed, mapping prompts mappers to articulate what they think and why.

It is usually manifest as a very simple diagram with nodes representing relevant issues and action, labelled with sentences describing a state, or activity, and arrows showing how one action leads to another, or how one issue impacts upon another. As discussed in relation to ToC, and echoed as a definition of cognitive mapping, the value of this method "is not in the tool itself, but the conducting of the interview which will lead to the establishment of the cognitive map" (Bouyssou 2006).

3.4.1 Variations on Cognitive Mapping

Mapping can be used as a pre-decisional tool; most often through causal mapping as a group facilitation technique. It can also be used to passively document, rather facilitate an individual or group decision path, to provide transparency and detail to flesh out articulation of the intent and scope of a program. Finally, it may be applied retrospectively, as an attempt to

understand why decisions were made, and to use that understanding to choose appropriate courses of action, or to determine where an error may have been made.

When applied to planning, cognitive mapping can capture and elaborate on a single line of command logic, or causal mapping can capture and compare the intent of multiple stakeholders. The utility of individual or group mapping for drafting or evaluating a plan will depend on the degree to which a plan is directed from a single senior source or the product of multiple inputs. Where a plan is a top-down directive, cognitive mapping can capture a senior decision-maker's logic that underpins the plan, which can then be articulated as program logic and be more likely to be accurately interpreted by those executing the plan. This subordinate interpretation of program logic has also been referred to as Theory of Mind (ToM) (Vartanian 2008), which is a variation on cognitive mapping. ToM refers to the formation of assumptions about what another person is thinking (i.e. *their* cognitive map). When we do not have direct access to the cognitive map behind a decision or plan, we can only make assumptions about the intent and expectations behind it, to inform how we should behave in response. This is a common, informal mechanism for anticipating and responding to the behaviour or expectations of others, usually in very immediate contexts. For example, when driving one uses observation of the gaze of another driver, combined with knowledge of the road ahead, to make assumptions (a ToM) about what they intend to do, so that one might be prepared to respond if they are slowing to turn a corner. In less immediate terms, when executing a plan, it is necessary to make assumptions about the cognitive map of planners, in order to interpret how they intended the plan to be translated into action. Different stakeholders may form very different ToMs, depending on their experience and access to planning information, and this will affect the consistency and effectiveness of overall execution. In military terms, the accuracy of a subordinate's ToM will depend on the quality of strategic guidance, their experience and knowledge, and the degree of detail and context provided in a plan. The significance of this is that by using the term ToM, we have a vocabulary for differentiating between the cognitive map (logic) of planners and what ToM (subordinate assumptions) are made by those who translate the plan into action. This gives both planners and evaluators an additional level of granularity for assessing why a plan may be contested, or be failing to achieve its objectives. The plan's logic may be flawed, or perhaps the way in which that logic is being interpreted may be flawed.

There are a variety of techniques for testing the extent to which the cognitive or causal map underpinning a program is understood or shared by those responsible for executing it. These include the spectrum of sense-making techniques⁸, cluster analysis or word recognition software to quantify the overlap and degree of similarity between mental models (Bryant 2008). A range of software tools have been developed which can support these forms of analysis and comparison. However, if the aim of the process is to generate discussion, or to provide a start point for group engagement, mapping can equally be carried out using a whiteboard or pen and paper.

⁸ Comprising a range of group facilitation, narrative and software techniques associated with sense-making methodology since 1972. Dervin, Dr B, *Sense-Making Methodology Website*, <http://communication.sbs.ohio-state.edu/sense-making/>, accessed on 6 November 2012.

3.4.2 Potential for application

While cognitive and causal mapping align with the DSTO's aim to support CA by drawing out the logic and assumptions of programs, it requires engagement from decision-makers to articulate what their decision path is. In the Defence operational planning context, gaining access to high-level decision makers, particularly during urgent crisis response planning phases, is unlikely. More frequently, the support provided to planning and evaluation is occurring after key decisions have already been made, and a plan has already been drafted. Therefore, there is rarely an opportunity to apply mapping techniques at the point of decision making. At best, one may hope to apply them retrospectively or at lower levels of planning, but this is essentially an exercise in surfacing the assumptions that planners are making about the intent of decision-makers; eliciting their ToMs. This suggests that elements of ToM may be the most appropriate form of cognitive mapping to apply to CA. Including questions from a ToM perspective in an evaluation framework may elicit additional assumptions and risks, as it will prompt stakeholders to explain how they assume the plan is intended to be executed, and the risks they associate with their version of the plan.

Even where eliciting pre-decisional cognitive or causal maps is possible, they are not sufficient in themselves to lead to transparent planning and accurate evaluation. Causal mapping may offer structure to a facilitated group discussion, but would need to be used in conjunction with a framework that will draw out the implications of the information they reveal. As with ToC, it is assessed that mapping techniques may be beneficial as the first step in a framework that proceeds to systematically analyse the logic, assumptions and risks that emerge as part of the discussion.

Examining cognitive and causal maps may be particularly useful in the identification of indicators of progress for evaluation. Our own cognitive map, or our ToM of how others will react to a given action is a useful construct for reviewing the effect that operational tactics are anticipated to have on a target population, or on the enemy. For example if our ToM on how locals will respond to foreign military presence is incorrect, an entire operation may be undermined. Alternatively, if our ToM about the extent to which insurgents will be deterred by security force presence is incorrect, we may find that an operation is less effective or takes longer than expected.

While cognitive and causal mapping does not provide a single, scalable approach that is applicable before, during and after planning, it does provide a vocabulary for concepts that are useful for development of an alternative framework. This includes:

- the requirement wherever possible to seek articulation of decision paths;
- comparative analysis of different cognitive maps as a mechanism for distilling a common logic;
- the point at which initial cognitive maps begin to be translated into ToMs;
- the dual components of a plan's logic that may be made explicit – the original cognitive map, and the ToM that subordinate decision makers and users of the plan construct.
- the difference between the risk of flaws in original cognitive map, and risk of inaccurate translation into program logic or action.

- the ToMs about local population's response to planned activities in different cultural contexts.

3.5 Synthesis of Theories

This review of relevant theories reveals a number of potential approaches to eliciting priority information requirements in planning and evaluation. Both ToC and Program Theory are comprised of a number of mental models rather than sets of techniques. In this sense they are theories rather than methodologies. As such, they provide guidance for scientifically considering a problem, but not the actual techniques for applying that mental model throughout the steps of planning and evaluation. Once a theory is found to be valid, it therefore requires a framework for practical application. A large variety of frameworks and techniques have been developed by other agencies in the evaluation field which apply ToC and Program Theory⁹, but none seem to meet the specific needs of Defence. Other agencies' adaptations of the theories provide partial solutions, and offer options for improving aspects of the planning and evaluation processes, but each approach had some characteristics that were not suitable for the practical constraints outlined under 2.2 above. For example, many existing program planning frameworks required a sizeable, dedicated planning team to conduct investigations as inputs to the process, which is not currently within the capacity or timeframes of ADF operational planning.

What is needed then seems to be the development of a bespoke framework which blends the advantages of a variety of approaches. Comparison of different approaches shows that the techniques or outputs of some are very similar, and it is simply the mental constructs or the theoretical origins that are different. For example, making explicit one's own cognitive map, or questioning the accuracy of one's ToM, is essentially a cognitive science version of ToC. This suggests that blending these approaches is possible.

Consideration of campaign planning and CA using the mental models offered by the theories reviewed has yielded a number of insights for the development of a framework for application. For example, we are now able to identify a set of critical campaign functions (See Figure 2) that will be potentially enhanced by the illumination of a plan's logic and assumption linkages. These are:

1. Initial planning,
2. Detailed understanding of operational plan and context,
3. Evaluation of interim progress,
4. Revisions of plan,
5. Identification of indications of end of military campaign,
6. Lesson on success or failure.

⁹ For example, Dr J. Dart et al, *Evaluation of AusAID's Engagement with Civil Society: Evaluation Plan* (2011) and many other case studies published by The Office of Aid Effectiveness, AusAID. Also, *Enhancing Program Performance with Logic Models*, University of Wisconsin, 2003, <http://www.uwex.edu/ces/lmcourse/> (accessed 7 October 2011). Many other examples can be found are reported in the *Evaluation Journal of Australasia*, Australasian Evaluation Society.

These six campaign functions provide a spectrum of operational functions that can be prioritised for trial application of a framework. Review of ToC has revealed that the aims of the current research essentially seek to develop a way of thinking that prompts planners to ask certain questions and requires the articulation of answers in a certain way. Therefore, the success of the framework as a platform for promoting a way of thinking becomes paramount, regardless of the exact techniques used to achieve it.

Consideration of the potential applicability of Program Theory provides the insight that the concept of converting an established campaign plan into a program theory model, or any other entirely new problem structure, is likely to be rejected as requiring excessive time and staff inputs for Defence's very tight operational decision-cycles. Therefore, a theoretical model that offers analysis steps, through which existing components of a plan can be enhanced or evaluated in an evolutionary way is preferable to a framework that involves revolutionary alterations. By focusing on analysis steps for eliciting priority information requirements, it is apparent that the categories of information specified within Program Theory are of potential value as a checklist for analysis questions. Similarly, within cognitive and causal mapping theories, we find that inclusion of analysis questions from a ToM perspective in an evaluation framework may elicit additional assumptions and risks, as it will prompt stakeholders to explain how they assume the plan is intended to be executed, and the risks they associate with their version of the plan.

Of greatest significance, all of the theories reviewed contribute to a working vocabulary for discussing requirements for a credible and practical planning and evaluation process, and for describing the analysis steps that process contains. This vocabulary can now be applied in the development of a Defence-tailored framework.

3.6 Conclusion

This chapter has explored a number of theoretical platforms that offer mental models or techniques that have potential to enhance the DSTO's support to Defence planning and evaluation. While it would be ideal to have additional time to explore all potential theoretical sources, the insights derived from this limited review, and the applicable analysis steps discovered, suggest that the essential theories have been covered. However, this literature review has also revealed the ways in which each theoretical approach has limitations for our research context, providing an opportunity to consider adaptations and blending of elements of a range of theories to satisfy Defence's particular requirements. The next Chapter will document the adaptation of these theories to provide the building blocks for a Defence-tailored planning and evaluation tool.

4 Design and Testing of the Logic, Assumptions and Risks Framework

Chapter 3 explored the theories identified as being most relevant to the aims of this research. This has produced a summary of the most instructive and least suitable elements of each approach for use in design of a Defence-tailored framework to support planning and

evaluation. This chapter describes the subsequent design phase of turning theoretical insight into a practical solution by synthesising beneficial elements of each approach into a single unified framework. It will then step through each of the elements of the resulting Logic, Assumptions and Risks Framework (LARF) framework, providing explanation of why and how each is included. Finally the method for testing and assessing the LARF as a viable solution will be described, before this method is put into practice in the next chapter.

4.1 Design of the Framework

The LARF is primarily designed as a platform for promoting a particular way of thinking. It prompts analysts and planners to pose a particular set of questions, which are required to be answered in a particular way. In practice it serves as a checklist for drawing out the essential information that planners and evaluators need to consider. The simplest way to achieve this is to create a matrix in which a set of priority information requirements is systematically extracted from every aspect of a given plan or program.

The construction of the LARF involved a simple matrix format in a Word document, which was altered and exchanged between two DOSC members over several days. The framework was repeatedly altered until it included enough categories to elicit all of the desired information, but did not constrain responses or potential for application. Categories in the matrix were also considered with respect to their scope for including pertinent evaluation questions identified in the literature review. This resulted in the creation of Logic, Assumptions and Risks columns, as shown in Figure 5.

<i>Line of Operation:</i>					
a. From	b. To	c. Logic	d. Assumptions	e. Risks	f. Questions
Effect 1:	Decisive Condition:				
Effect 2:					
Effect 3:					
Effect 4:					

Figure 5: Components of the LARF matrix

With a satisfactory draft framework in place, an opportunity was created to socialise it within the DOSC CA team, which involved arranging for the LARF to become the centrepiece of an internal workshop, as part of preparation for the Quarter 4 Operation Slipper CA cycle. A Noting Brief was produced to accompany the workshop, which explained the basis, mechanics and aim of the LARF. The internal workshop was held on 14 December 2011, and while the details of this trial are covered under Section 5.3 below, it can be noted here as part of the development of the framework, that participant response was entirely positive and there was no indication that any aspect of the matrix was inadequate. The design of each component of the matrix is briefly discussed below, but will be discussed in detail under “Technique for Applying the LARF” in the next chapter.

4.1.1 Logic

The logic component of the framework was designed with a “To” and “From” column to enable users to define what level of a plan, or what aspect of strategic guidance, they are going to nominate as a start point by placing it in the “From” column. This addresses two potential challenges recognised in eliciting logic. Firstly, any form of narrative elicitation can be time consuming and require lengthy transcription, especially with multiple participants. This would not be suitable for many of the anticipated Defence applications of the LARF. Secondly, for a large-scale, complex plan or program, it can be difficult to distinguish between multiple strands of logic or ToCs, and to examine each in adequate detail to draw out a comprehensive set of assumptions or risks. For example, when used for analysis of an already endorsed Defence campaign plan, users may only be seeking to derive the logic at the level of linkages between Effects and Decisive Conditions, because they are not authorised to revise the levels of the plan above this. Participants are then required to nominate what actions taken in relation to that aspect of the plan are aimed at achieving, by describing the desired state in the “To” column. This information should be easily identifiable in any plan or program, even at the earliest drafting stages, and from here, the more difficult question can be posed of why participants expect that column a) will lead to column b)? It is this explanation of causality that can be captured under the Logic column.

4.1.2 Assumptions

The need to recognise and monitor assumptions has consistently been at the centre of analysis in support of Defence planning and evaluation. Therefore, a mechanism for systematically documenting them was a necessary inclusion in the LARF. Defence, like all other organisations, must make plans in the absence of certainty. When looking for the logic in a plan, it becomes clear that all plans are essentially sets of assumptions. The more complex a plan is, the more assumptions it has to make to describe the current condition, the intended actions, and the expected future outcome. The accuracy of a plan and the effectiveness of a program depend on the extent to which the assumptions underpinning it hold true over time. Assumptions must be made about the accuracy of available information, or where information is unavailable, about how a scenario is likely to play out. Without assumptions, no policy or plans would be possible. When assumptions are correct, the goals and actions defined within a plan appear to be logically coherent and achievable. However, if assumptions are not correct, then the very foundations upon which the goals and objectives we are seeking to achieve, and the plan of action we are pursuing to accomplish them, may be flawed. In DSTO’s provision of scientific expertise, the process of seeking to understand the underlying assumptions of an operation can be likened to evaluating the validity of a hypothesis (Suchman 1967). A plan’s logic cannot be verified unless its underpinning assumptions are understood and assessed to be correct.

In the evaluative research field, assumptions are often classified into two forms - value assumptions and validity assumptions. Value assumptions relate to the system of beliefs that determines what is good, or desirable, for the scenario at hand. Validity assumptions on the other hand, relate to anticipated mechanics of bringing about change and what will be apparent as indications of that change (Suchman 1967). This distinction is made with various labels, such as Chen and Rossi’s (1983) basic construct assumptions, about human nature, the

nature of the problem and of the population, and the boundary, or limiting conditions, of the effects of the program – what Checkland and Poulter's (2006) Soft Systems Methodology alerts us to as differing 'world views'. These are contrasted with assumptions about the causal linkages about the implementation of the program. Both of these forms of assumptions have been included in the facilitator questions suggested for populating the assumptions column under the LARF technique in Chapter 5.

Without a perfect picture of the present and future environment in which a plan is to be executed, it is inevitable that some initial assumptions will prove to be incorrect. Most commonly, as the environment evolves, or as more information comes to light over time, some initial assumptions are shown to be flawed. This need not be problematic if assumptions are explicit and monitored. By listing assumptions in the LARF, either in an initial workshop, or as they become apparent, they can be reviewed as new information becomes available. An assumptions column is provided in the LARF linked to each strand of logic, so that when an assumption is shown to be incorrect, it automatically indicates that its associated logic requires revision. In this way, the LARF enables constant adaptation of elements of a plan.

4.1.3 Risks

The risk component of the LARF provides a space to specify the 'so what' of the information elicited in the other columns of the matrix. Each strand of logic or assumption has a risk associated with it, but there are also overarching risks to the achievement of each component of a plan. This column can be populated with risks that emerge during the course of discussion of logic and assumptions, which may be recognised as points of contention where participants disagree about the likelihood or viability of logic paths. Capturing divergent views on achievability or likelihood as risks in the LARF allows planning to proceed despite a lack of consensus.

Each risk should be stated in terms of likelihood and impact, so that there is an emerging indication of which lines of the plan are considered most likely to fail, and which would have the greatest consequence. This information in the Risks column enables planners and evaluators to make evidence-based decisions on what aspects of the plan should be prioritised.

4.2 Testing the Framework

To gauge whether the LARF is viable, it is necessary to demonstrate that it is able to produce the information outputs to satisfy the research requirements, and also that it is suitable for use within the practical constraints of the research context of application. Therefore, the LARF has initially been tested using a series of trial applications, which will be detailed in the next Chapter. These trials were conducted as part of on-going support to operational tasking a consequence of the operationally-focussed DOSC research environment, in which research needs to be immediately applicable to current operations, and where there are rarely opportunities to test hypotheses in isolated simulations or controlled trials. However, as will be discussed below, the trials were deliberately selected to cover a spectrum of different critical campaign functions, so that conclusions could be drawn about the utility of the LARF in a variety of applications. The method for testing the LARF in each of these trials is by

assessing the extent to which the research aims set out in Section 1.2, and satisfaction of the set of criteria derived from the practical constraints discussed in Chapter 2. These trials, aims and criteria will be described here, before the trial case studies are presented and assessed in the remaining chapters.

4.2.1 Trials

The LARF was initially tested in a small scale internal trial within DOSC in December 2011, which will be described in detail in Section 5.2.2. This initial testing delivered some findings on how a LARF workshop should be facilitated, and how that facilitation might manage the pace and content of contributions. Again, these findings are detailed under the “Application and Results” chapter to follow. After the initial successful internal trial other opportunities were sought to expand the application of the LARF for a variety of phases in the planning or evaluation cycles other purposes within the CA and planning cycles. The range of trials selected cover four of the six critical campaign functions identified under Section 3.5, and demonstrate whether the framework is scalable and flexible enough to suit a range of applications. The four critical campaign functions upon which the LARF is trialled are:

1. Initial planning,
2. Continual situational awareness and understanding of operational plan,
3. Evaluation of interim progress, and
4. Revision of a plan.

These functions are easily identified in the high tempo tasking environment, and include testing in Defence operational headquarters (HQJOC), as well as in ADF deployed areas of operation. The findings from each of these trials have been integrated into the evolving LARF workshop approach. The second campaign function was covered in the initial internal trial (referred to in Section 5.2.2), which is included in the description of how each trial proceeded is captured in Chapter 5. There has not yet been an opportunity to test the LARF on the two remaining critical campaign functions (Identification of indications of end of military campaign; and Lessons on success or failure). These two functions have become the subject of proposed future research (as will be discussed in Chapter 7).

The LARF was trialled as part of active, and also security classified tasks, so it was not possible to make arrangements for independent trial observers, or to separately record process observations, while simultaneously facilitating the LARF workshops and populating the LARF matrix. Therefore, assessments of outcomes of LARF workshops are to date based upon informal after-activity reviews by research team members, making reference to the data recorded in the LARF matrix during workshops, and the information contained in CA MoE data collection templates¹⁰, in which LARF findings have been incorporated.

4.2.2 Aims and Criteria that indicate a quality solution

A consistent theme of this research is that the viability of any proposed solution will be determined by the extent to which it meets the research aims, combined with its overall

¹⁰ Both the LARF workshop matrixes and MoE response templates populated with operational data are security classified and so cannot be shown, or referred to as specific examples in this report.

practicality. Therefore, results of LARF trials will be assessed against the three research aims defined in Section 1.2, which are:

1. To highlight the priority information components of a plan that enable CA.
2. To investigate whether it is possible to develop a framework that can be applied to the CA process to draw out the information components that have been identified as priorities.
3. To consider whether the framework developed can be applied to drafting of new plans and reviews of existing ones, so that priority information components are clearly articulated in future plans.

In order to achieve these aims within the constraints of the research context, described in Chapter 2, research outcomes must meet a number of practical criteria. These criteria have been expanded to include insights as they have emerged from trials, resulting in the following six criteria: To be considered practical and relevant the LARF must:

1. have clear and cohesive outputs;
2. be easy to summarise into a variety of different formats (i.e. summary table; narratives for briefs or reports, key categories for information requests or existing evaluation templates);
3. have a natural flow that does not have participants slavishly stepping through disconnected components;
4. be flexible and scalable enough to allow extra time or emphasis to be given to different steps, in response to participant preferences;
5. be rapidly executable start to finish, without prior knowledge of underpinning theory or techniques; and
6. be executable with the minimum resource investment necessary.

These aims and criteria have shaped the development and testing of the LARF, and will be the basis for assessing outcomes in the Chapters to follow.

4.3 Conclusion

The preceding discussion has set out the research method used to develop the LARF and the method by which the viability and value of the LARF can be tested. This lays the foundations for understanding how the LARF is constructed to integrate the information elements that have been consistently identified by the DSTO research team as critical to effective planning and evaluation in Defence. This chapter has also provided clarity on how research of this type may be replicated in future. We will now proceed with an explanation of the trials of the framework which can now be understood to be part of an overall research method of demonstrating the LARF's immediate applicability and potential for future development.

5 Application and Initial Results of LARF

The preceding chapters have captured the method for the development and testing of the LARF. This chapter outlines the technique recommended for application of the LARF and will describe how the framework has been tested through application to three different Defence

operations in four different critical campaign functions¹¹. The LARF has proven to be an effective tool in each instance, with a number of unexpected advantages. The detail of the three operations to which the LARF has been applied cannot be discussed in an Unclassified format. However, a brief definition of each of the operations is given in Section 5.2 below to enhance understanding of the terminology and context, before the application and the results are discussed in generic terms.

5.1 Technique for applying the LARF

A structured discussion format approach has been used as the means for drawing out the information and populating the LARF. Leveraging off the techniques commonly used in Program Theory, ToC, and Cognitive Mapping guided, DSTO analysts facilitating a structured discussion process, introducing participants to the LARF concept before leading them through each of the matrix categories. This format provides a significant degree of the adaptability the study is seeking, because facilitators can use the LARF matrix to prompt questions and drive discussion where information does not flow freely or where participants are unsure of what it required. Alternatively, facilitators may use the LARF matrix as a reference point to anchor discussion, where information flows freely from participants, but needs to be focused. In this instance facilitators can clarify whether issues that emerge are best captured as Logic, Risks or Assumptions. The LARF was designed so that each of the categories does not have to be worked through in sequence, and in some instances, it may be easiest to go straight from Logic to Risks, and the rest flows from there. The focus at all times is on prompting useful insight, rather than slavishly populating the template. However, if it is too difficult to think of content for a particular section of the template, this may raise questions about the validity or appropriateness of that component of the plan.

The LARF is also designed to enable the flexibility to select the appropriate scale for the a given task. A facilitator is able to initially establish what the LARF application is aimed to achieve, and at what level are component parts of the plan or program changeable. This will determine what level of change components are placed in columns a) and b), which in turn will shape the level at which logic is drawn out for analysis in column c).

5.1.1 Logic

There are a number of considerations for LARF facilitators when populating this component of the matrix. Firstly, the aim of the logic column is to state how column a) is expected to lead to column b) in the simplest possible terms. Restating the aims or objectives as set out in the plan or strategic guidance will have little value. Instead, participants should be encouraged to clearly interpret the ToC logic from a) to b) as they understand it, so that the veracity of the logic can be seen in the absence of euphemisms, political semantics and organisational terminology. For example, logic statements like “Disruption of insurgent group X’s supply of component Y, through consistent presence on transport routes will degrade their capability to execute deliberate operations in the area”, can be simply stated as “If access to resources is made difficult, the bad guys won’t be able to attack”. Stated this basically, inherent assumptions and risks are more obvious without the distraction of detail and context-specific

¹¹ As defined under Sections 3.5 and 4.2.1.

terminology. This facilitator's strategy of translating narratives into simplified statements and echoing them back to participants may also overcome hesitation by participants to verbalise logic narratives. Reluctance to share knowledge has been observed on occasion in trials, and sometimes attributed to concern by a participant that their level of knowledge and language may not be understood by the rest of the workshop group. If this is suspected, facilitators may ask the participant to offer a narrative of logic in their own words, as they would if everyone in the room was an expert¹². The facilitator can then encourage the group to interpret the narrative and echo it back to the participant in simple terms, until there is mutual satisfaction that the logic has been captured.

Secondly, drawing on the theoretical insights from causal and cognitive mapping, LARF facilitators are encouraged to be mindful of the two types of logic that may be made explicit – the original cognitive map, and the ToM that subordinate decision makers and users of a plan construct. When a logic narrative is elicited through the approach described above, it may be useful to ask whether participants consider this to be reflecting their own cognitive or group causal map, or whether it is their interpretation of logic drawn from elsewhere. By acknowledging that our logic may be simply an interpretation of guidance from another source or a ToM about senior command intent, we can highlight and question assumptions about intent, the credibility of the source of that logic, and the risk of our interpretation being accurate.

The LARF does not assume that participants can simply be asked to articulate the logic behind their plan to begin populating the matrix. As cognitive mapping has shown, people may frequently be able to state their goals, or describe an activity they wish to undertake, but articulating the thought process behind why they seek those goals, or why they believe one course of action is preferable to another, is more challenging. Therefore, trials have shown that when attempting to encourage planners or evaluators to articulate these mental constructs, it is often useful to ask for a narrative of what they saw as their start point, and the story of how they envisioned progressing from there to the desired end state. This is aligned with the technique for surfacing logic through ToC or cognitive mapping.

It may also be useful for facilitators to consider whether the logic strands that are emerging are macro or micro ToCs. This may provide a reference point for facilitators to identify what level of logic is sought, and where necessary to prompt participants to draw out more micro or macro ToC logic. For example, if the LARF is being applied at the early stages of plan drafting, or as part of an entire plan review, it will be useful for the logic component to address the 'big picture' questions. Surfacing these macro ToCs allows revision and validation of the entire premise of a plan, as well as the assumptions and risks associated with it. These macro-level ToC questions may include:

¹² This technique is derived from Shawn Callahan's article in "Anecdotaly" Newsletter January 2013, Anecdote Pty Ltd., a commercial consultancy specialising in narrative technique for business storytelling, strategy and employee engagement, Melbourne.

- What is our organisation's/section's mandate as part of the whole agency/ national effort?
- What are the thresholds for success/failure – what degrees of each are acceptable?
- What interdependencies and flow-on effects are we taking account of?
- What longer-term outcomes do we seek, and what interim outcomes and contextual conditions are necessary and sufficient to produce those longer term outcomes?
- How will our intervention be received and perceived by locals?
- Are we seeking sustainable change?
- What aspects of the program are, and what are not, at our discretion?
- Who are the stakeholders in this initiative? What do we need them to do, and what are we assuming they're doing? When do they need to do it? What are the links between different stakeholders?
- What will be happening in the surrounding environment while we are achieving the desired changes?

Also, where the LARF is applied retrospectively to an existing plan, macro ToC logic can be used as a form of 'gap analysis' to highlight divergences between stated objectives and planned actions; ie. between the macro ToC and events in reality to date. Evident divergences, may then be noted as flawed assumptions or risks. By applying this approach to the remainder of the program or plan at the same nominated level, there may be some repetition of logic for various aspects. Where there is repetition of logic, this can be noted as an assumption or risk of interdependency between two aspects.

Alternatively, if the aim of the planning or evaluation task that the LARF is being applied to is to examine the actions or chains of events that will achieve higher level objectives, then a focus on micro-level ToC logic will be more useful. A LARF facilitator may identify that participants are focusing on re-stating the macro-level logic contained strategic-level guidance, whilst trying to review the lower level activities or Effects of a plan. This may necessitate re-focus on micro ToCs to reveal the logic of sequencing and causality of activities, and explain how a given action is expected to enable subsequent actions, or to lead to a given change. Some of the aspects of logic that we would be seeking to draw out in micro ToCs are:

- Statements on how targets are expected to respond to intended actions;
- Any critical interdependencies between stakeholders or actions;
- Capabilities required of our own force and others;
- Triggers for initiation and expected duration for actions;
- Visibility of impact and key indicators of end of activity.

When using the LARF to draw out or revise evaluation frameworks, micro ToC logic is more likely to describe intended change in sufficient detail to reveal indicators of progress and the assumptions and risks associated with them. The research team has found in previous experience that, if devising or validating evaluation metrics for a particular portion of a program is difficult, it is often because the logic behind that part of the program is not well understood. Application of LARF with a lower-level focus can assist in drawing out that logic and the indicators of progress associated with it.

5.1.2 Assumptions

During a LARF workshop, assumptions are likely to emerge as part of broader discussion, and can be noted by the facilitator in the template as they arise. When populating the LARF, facilitators should be seeking to prompt surfacing of the following forms of assumptions:

- definition of the nature of the issue for resolution;
- assertions about connections between long-term, intermediate and early outcomes;
- expectations that inputs and mechanisms for required action are available.
- belief that all pre-conditions have been identified and are in place;
- statements anticipating certainty of links between activities and extent of impact; value judgements about standards and acceptable behaviours;
- contextual/environmental factors that support or hinder progress towards outcomes.¹³

Several of these types of assumptions relate to expectations of the way that other people think, and in this respect, are aligned with the ToM defined in Chapter 3 under cognitive/causal mapping theory. The significance of this is that it reminds facilitators, when prompting examination of the framework's logic column, to ask what are the assumptions contained within it about how others will perceive, and behave in response to, a program of activity? Are these culturally, geographically or time dependent?

It is likely that a set of assumptions will be documented for each strand of logic. However, it is also possible that participants will sometimes be able to identify their assumptions about a component of a plan before they are able to define the logic that those assumptions stem from.

5.1.3 Risks

The risks listed in the LARF prompt participants to consider the consequences or likelihood of failure associated with each component of the plan. Risks may emerge in two forms: the risk of each assumption being flawed; and the risks associated with failure to achieve each element of the plan. Both can be listed in the Risks column, and both require participants to specify likelihood and anticipated impact of each risk. Where participants struggle to decipher the logic or assumptions for a given component of a plan, facilitators may find that discussion can be prompted by starting with identification of the risks associated with a given component of a plan. While it is obviously not constructive to record each and every possible risk, users of the LARF may make assessments on those risks that are significant enough to be noted in the LARF. It is advisable that the criteria for significance of risk is established prior to commencement of LARF workshops, (i.e. degrees of likelihood and impact, or degree of consensus) so that time is not wasted documenting minor and unlikely risks, and also so that significant risks can be documented, even if there is not consensus on their likelihood. There are some risks that decision makers are prepared to take, because their impact or likelihood is low in comparison to the perceived benefits. Other risks may not have been considered, but need to be noted for monitoring, mitigation or further investigation before a plan can proceed.

¹³ Partially drawn from A. Anderson, *Theory of Change as a Tool for Strategic Planning: A report on early experiences*, The Aspen Institute Roundtable on Community Change, 2004.

Facilitators are encouraged to ask participants to consider the risk that some of the key terms used in logic or planned objectives, could be defined differently by different stakeholders. This is derived from a research and planning technique known as “the believing game” (Elbow 1973) where participants are asked to place themselves in the position of believers in a given assertion or process, to surface all of the perspectives on how it may be correct. This can be coupled with “the doubting game”, where opposing perspectives are drawn out. Peter Elbow, who is attributed with introducing these techniques suggests that the believing game allows you to project yourself into another's point of view, to try it on for size, to “try to have that experience of meaning”. For the purposes of LARF, consideration of alternative definitions may highlight the risk of misinterpretation, or lack of clarity in a plan.

5.2 Trial Applications

The technique described above has been consistently used for applying the LARF to all trials to date. As stated previously, the details of these ADF campaigns and the specific outcomes of the LARF trials are security Classified. However, each campaign is briefly defined below to provide context for the trials, which are described in detail under sections 5.2.1 – 5.2.4

Operation SLIPPER

Australia’s military contribution to the International Security Assistance Force (ISAF) in Afghanistan is deployed under Operation SLIPPER. Australia’s military contribution includes an annual average of 1,550 Australian Defence Force personnel deployed within Afghanistan. These numbers vary depending on operational requirements and shifting seasonal conditions. Approximately 800 personnel provide support from locations within the broader Middle East Area of Operations, including our maritime commitment. In keeping with the ISAF strategy to strengthen civilian engagement in Afghanistan and to better integrate civilian and military efforts, Australia now has around 50 civilians working in Afghanistan, in addition to around ten Defence civilians. Australia’s substantial military, civilian and development assistance focuses on:

- Training and mentoring the Afghan National Army 4th Brigade in Uruzgan province to allow transition of lead security responsibility for the province.
- Building the capacity of the Afghan National Police to assist with civil policing functions in Uruzgan;
- Helping improve the Afghan Government's capacity to deliver core services and generate economic opportunities for its people; and
- Operations to disrupt insurgent operations and supply routes utilising the Special Operations Task Group.¹⁴

Operation ASTUTE

Operation ASTUTE is the ADF’s continuing contribution to the maintenance of peace and stability in East Timor, following a request from the Government of Timor-Leste to the Australian Government in 2006. The Australian-led International Stabilisation Force’s role in

¹⁴ Australian Department of Defence public website, <http://www.defence.gov.au/op/afghanistan/info/general.htm>, accessed on 13 February 2013.

Timor-Leste has now changed to the redeployment of people and equipment following the termination of the United Nations Technical Arrangement. The current agreement with the Government of Timor-Leste will see International Stabilisation Force troops start to depart Timor-Leste in late November and early December and current bases remediated for handover by mid - 2013.¹⁵

Regional Campaign Plan

In recent years, the ADF has developed a Regional Campaign Plan to define and coordinate ADF activities and resources devoted to all forms of engagement across the Asia-Pacific region.¹⁶

The LARF has been trialled on different critical functions in each of these campaigns as follows:

- an initial planning tool – to test validity of proposed objectives, draft underlying detail of those objectives, and concept of how their achievement will be assessed (Regional Campaign Plan);
- a group learning exercise for building situational awareness – the basis of a forum for exchange of ideas and knowledge, for experienced and inexperienced. Also served as an effective team-building exercise which revealed individual's areas of expertise, strengths and weaknesses (Operation Slipper);
- a structured format for revision and validation of an existing plan and evaluation framework (Operation Astute);
- a tool for generation of a set of risks and assumptions to be added as indicators to an existing set of measures of effectiveness (Operation Astute).

5.2.1 Initial Planning

The application of the LARF in early phase campaign planning was primarily aimed at providing structure for the team to draw out the information they had identified as being critical for inclusion in a quality plan. This was in recognition of the fact that the longevity and scalable flexibility of a plan depends on whether it is written in a way that articulates sufficient intent, logic and explanation of what combinations of activity are expected to lead to progress and ultimately success. The LARF was developed to reveal the logic behind why a given set of activities (i.e. a set of military campaign *Effects*) is assumed to lead from the undesirable state to the desired one (*Decisive Condition* or *Endstate*). Provision of structure during this phase was considered necessary to demonstrate rigorous, comprehensive consideration, and also to provide momentum and clarity for planners trying to navigate their way through the synthesis of a broad number of complex variables into a single cohesive plan.

The LARF was first used for this purpose during the drafting phases of an ADF Regional Campaign Plan for engagement across the entire Asia-Pacific region from mid 2011. When the DSTO's support was requested, the draft plan already had proposed objectives, based on

¹⁵ Australian Department of Defence public website,
<http://www.defence.gov.au/op/eastTimor/index.htm>, accessed on 13 February 2013.

¹⁶ HQJOC J5 Plans Branch email to Alison Hickman, 14 November 2012.

strategic guidance, but the task of confirming that guidance had been comprehensively represented remained, as well as teasing out the underlying detail of those objectives, to scope of how they are to be achieved and how success or failure would be assessed. Therefore, the LARF was used as the basis of a workshop to review each of the draft objectives and consider how the causes, opportunities, consequences, stakeholders, and desired changes in each objective were being translated into plan logic. Here the LARF would provide structure to what was essentially a problem definition and scoping exercise, to prompt discussion of the planners' ToC, and generate a shared concept of scope for the program, and where it sits relative to the activities of partner agencies and the broader operating environment. It was determined at the outset that the focus of the LARF for this purpose would be at the macro-theory level, given that the aim at this stage was to analyse the higher level logic of the plan. However, when assessing the risks and assumptions of this higher-level logic, the emergence of any micro-theories was also considered valuable for understanding what would be required to manifest change and when.

In order to get the best possible insight into each aspect of the plan, representatives from each relevant capability component of the ADF's HQJOC were invited to participate. Given that the LARF had been seen in other applications to give new understanding even to those very familiar with the plan or subject matter, the workshop also served as a consultation forum, enhancing the collective understanding of the intent and implications of the plan. In future, representatives from other Government agencies could also be included.

The workshop was run for half a day with each participant having received a preparation pack of the draft plan and a two-page noting brief explaining DSTO's role in support of the task, the structure and process of the LARF, and a list of immediate and subsequent outcomes for the workshop that had been agreed with the planners (Hickman 2012a). These were:

Immediate

- A LARF that documents comprehensive consideration about the goals and implications of each aspect of the plan. Ideally this content will represent the consensus of the group, but possibly not on every detail.
- An enhanced understanding by all participants of the intent, vision for execution, interdependencies and information requirements throughout the life of the plan.

Subsequent

- A detailed description of each of the plan's Effects, which can be inserted into the draft Campaign Plan, providing the kind of guidance that will enable future operational and tactical-level planning, monitoring and review.
- Visibility of any primary risks that are common across multiple Effects, which can be highlighted and prioritised for monitoring or prevention.
- A set of assumptions and risks that can be used in the development of an evaluation framework with Measures of Effect that are directly related to the logic behind each Effect.

An electronic version of the LARF matrix was projected onto a large screen, which had the draft plan's objectives listed in the "To" column, and the draft Effects in the "From" column. One member of the DSTO team acted as facilitator, and a second was responsible for populating the matrix as discussion progressed.

From the outset, participants were encouraged to step away from repeating explanations they were familiar with from draft documents, and to state the logic in their own most simple terms of how the Effects in column a) were expected to lead to the achievement of the Objectives in column b). These simple statements revealed divergences in interpretation of intent, and expectation of mechanisms for achieving it. Where these divergences arose amongst participants, they could be noted as assumptions. Discussion of logic eventually brought about a consensus with some participants being able to justify their version of logic as being derived from senior directives, or relevant experience. On other occasions, participants were willing to agree to a given statement of logic, as long as a number of risks associated with it were noted in the LARF, and the draft plan, for on-going monitoring. Deriving the logic of some Effects took longer than others, and the viability of those that were particularly problematic, or rested on excessive assumptions or risks, were questioned. As a result, a number of Effects were re-drafted, or moved to contribute to the achievement of a different Objective. Duplications in logic, or the apparent risk of high degrees of interdependency, also highlighted the need to merge or delete overlapping Effects. A broader understanding of the operational context was achieved, including recognition of opportunities and risks related to other Government agency involvement in the region.

At the completion of the workshop and subsequent tidying up of the resulting LARF matrix, all of the intended outcomes had been achieved. This was manifest in a matrix populated with revised Effects and grouping of Objectives, detail on the logic, assumptions and risks for each component of the plan, and narrative summaries of the overarching threads of logic, and the primary assumptions and risks of the plan. This was provided to planners for integration into the draft, and was also held by the DSTO team to form the basis of identification of metrics and indicators for an evaluation framework (an example of which is discussed in detail at 5.2.4 below).

5.2.2 Continual Situational Awareness

Any form of program or strategic-level planning and evaluation is a large and complex task that necessitates team input, from individuals with different expertise. Whether a new plan is being created, or an existing one is being revised or evaluated, establishing and maintaining sufficient knowledge within a team is a challenge. Reviews of ADF Campaign Planning have observed that the quality of campaign design is dependent upon: understanding of the situation; the quality of thinking and judgement that produces ideas to exploit the potential for change; and, the quality of processes that challenge conjectures (Smith 2011). Sometimes added to this, is the challenge of establishing a team across organisations, where the extent or concept of suitable knowledge or situational awareness, is not understood. Through their experience in supporting both planning and evaluation in Defence, the DSTO research team has found that base-lining, developing and sharing knowledge, is a valuable step at the initiation of a task.

It can usually be assumed that time will be limited, so some form of rapid group learning exercise was considered desirable to establish shared concepts and focus team members' thinking at the initiation of a task. The investment of one day for this form of development and consolidation activity is considered to be a valuable investment in the ability of the team to communicate, assign roles and prioritise effort in planning or evaluation tasks.

Prior to the initiation of one of the quarterly assessment cycles for the very large and complex ADF campaign plan for Operation SLIPPER in Afghanistan, the DSTO team that was intended to support the task was comprised of individuals with varying knowledge and experience. The LARF was proposed as a means of rapidly exposing team members to the entire plan, while prompting them to share and discuss their interpretation of it. Therefore, in December 2011, prior to the 2011 quarter four campaign assessment, the LARF was used for a one-day group learning exercise. To do this the LARF matrix was populated with Effects and then Decisive Conditions from the current Afghanistan campaign plan in the first two columns. Participants were then asked to contribute to population of the remaining columns, in any order.

This activity quickly generated a constructive discussion flow that centred around the premise of the plan and understanding what the plan's terminology and structure was intended to mean in practice. For these purposes, macro-theories were elicited and debated. This led to exploration of the risks and assumptions inherent in the logic for each component of the plan systematically surfaced detail about the variables and context that impact upon progress, emphasising the necessity for team members to build knowledge on these. In this way, analysis switched from macro- to micro-theories, but facilitators were able to monitor the level of detail and raise discussion back up to macro-level if participants were losing focus. Notably, the LARF process revealed individuals' areas of expertise, strengths and weaknesses, giving participants opportunities to request explanation of aspects of the plan or its logic that they did not understand, fostering a group dynamic of seeking and offering assistance. This demonstration of expertise also led to a group notion of appropriate allocation of responsibility for portions of the task. For a team of evaluators, interpretation of the plan into plain language was highly valued because it gave insight into what decision-makers were looking for as indicators of success or failure.

The greater depth of understanding of assumptions and risks, also meant that the team was better placed to identify information requirements, and consider what they should be looking for in those information sources. Ordinarily, some valuable data sources may be overlooked because they are not part of the direct influence of program activities or are not obviously linked to the ultimate objectives. However, identification of interim indicators of progress by articulating logic paths in the LARF, leads to recognition of less obvious data sources that may provide some insight, until conclusive outcomes become visible.

At the conclusion of the day, there was an enhanced sense of team identity, with less experienced members of the team having gained greater confidence in their understanding of the plan, and in turn, in their ability to conduct relevant analysis on assessment data. Conversely, during this activity and other applications of the LARF, it has been evident that even team members that are most familiar with the plan and its context, find new perspectives and consolidate their understanding of linkages. At the same time, they benefit from the ability of the inexperienced to contribute fresh insights into the risks or assumptions associated with widely accepted logic. Leading into the campaign assessment cycle, the LARF workshop had produced a matrix of some of the key considerations for each Effect, providing a checklist for evaluators to refer to when working through large amounts of data.

5.2.3 Revision of Plans

Identifying when initial ToC have been disproven or need to be adjusted is crucial for adaptive planning. In all forms of Defence's international engagements, outcomes and the conditions that bring them about (*Decisive Conditions*) are complex and cannot be prescribed with any certainty. Therefore, we may need to be prepared to adapt our idea of what the Endstate will look like, as the operating environment evolves. In order to do this without losing the intent of the initial strategic objectives, planners and evaluators need to thoroughly understand them, so that any divergences in progress or alterations to plans can be made within the scope of a consistent strategic shape. The research team's experience in supporting multiple revisions and updates of ADF campaign plans was that it is often done in tight timeframes, with any relevant staff that are available at the time, and with no pre-determined or repeatable process. The LARF was not designed specifically as a planning update tool, but it does provide structure for consideration of all components of a plan in a short-timeframe, highlighting key risks to the plan's logic that need to be addressed, and is therefore well-suited to be used as a part of a revision/redrafting process. Above all, the LARF offers a framework for examining a program's ToCs and evaluating whether its assumptions continue to hold true, or whether they need to be amended to avoid the risk of program failure.

With this in mind, in early 2012 the research team trialled the application of LARF to a review of the ADF's campaign plan for operations in East Timor, in preparation for anticipated future requests for support to campaign plan updates. This was carried out within the research team, drawing on extensive experience with the campaign plan and subject matter expertise on operations in East Timor. The LARF matrix was populated with the extant plan's Effects and Decisive Conditions, in columns a) and b) respectively. From here the remaining columns of the plan were populated as described in other applications above.

The outcome of this application was that no significant gaps or duplications in logic were identified, and the manner in which Effects had been grouped created a cohesive macro-theory for how each Decisive Condition would be brought about. It was noted that there was a risk that only having two participants in this LARF trial, both of whom were very familiar with the history and context of the plan, meant that much of the plan's logic appeared to be self-evident. The presence of an external facilitator, or participants with less prior exposure to the plan, would have potentially raised more questions about the cohesiveness of logic, and may have contributed divergent ToCs.

If gaps or flaws had have become evident for a particular Effect or an entire grouping under a Decisive Condition, the flawed assumptions and unacceptable risks associated with them could have been documented as explanation of why planners need to revise the plan, and what problems they need to address. This is considered to be particularly useful function of the LARF, because frequently, users of a plan feel that it is flawed or outdated, but are not able to effectively specify and justify why it requires review. The LARF would allow those who have doubt about a plan to pinpoint what it is that concerns them (i.e. gaps, poor structure, duplication, flawed logic, risky assumptions), and provide evidence of the risks associated with not addressing those concerns.

In this instance, the LARF process did prompt participants to reconsider the implications of the plan's logic in practice. The team were able to determine whether previous assumptions had been proven or disproven, and also to list the plan's risks, which had not been done in any systematic way before. The team found that they were prompted to view the plan in the context of the current and likely future operating environment, instead of viewing it as a static structure with insulated internal logic. This in turn increased consideration of the role of other Government agencies, and what communication may need to occur with them. In summary, this small-scale trial application of LARF validated the existing plan, leading to the conclusion that it did not need to be updated, but did provide additional insight into the assumptions and risks of that plan going forward.

5.2.4 Generation of indicators for assessing progress

DSTO's support to ADF campaign assessment is based around an evaluation framework which uses a set of Measures of Effect (MoEs) assigned to each Effect, which can then be aggregated upwards to provide an assessment of progress towards bringing about a Decisive Condition. These MoE sets are indicators of progress, but it is not expected that monitoring them will provide an entire picture of the program and all of the variables that impact upon it. Throughout the provision of DSTO support to fourteen campaign assessment cycles to date for various ADF operations, HQJOC decision makers have repeatedly expressed a desire for assessments to highlight risks and to draw conclusions on the veracity of the plan moving forward. MoEs alone do not provide this. They monitor how much of what we aim for is occurring, but do not monitor the extent of negative trends. Therefore, it has long been recognised by the DSTO team that the campaign assessment evaluation framework needs to incorporate consistent monitoring of risk and the extent to which the broader environmental context aligns with the expectations of the plan.

Following the trial application of the LARF described under 5.3 above, it was confirmed that it would be ideal for drawing out deeper insight into an extant plan. Specifically, the micro-theory detail of how change is expected to come about reveals additional monitorable indicators of progress that can be added to an existing evaluation framework, as well as pivotal assumptions and risks to be monitored. To demonstrate this, the LARF was used in early 2012, to review the existing evaluation framework for the East Timor campaign plan, with a view to identifying risks and assumptions that could be added. This involved the research team working through the LARF much the same as was done for the plan revision process detailed under 5.3 above. The output for this application was identifying perhaps one or two key risks and assumptions that could be added to the MoE template for on-going monitoring, as shown in Figure 6 below.

Effect 1: Destabilising elements in society have been reduced – <i>the influence of destabilising elements has been reduced to such an extent that they are no longer an impediment to the sustainable development of Country X.</i>						
Assumption: <i>Economic and social development is an impetus for the population to support the legitimate government and turn away from support to destabilising elements.</i>		Does this assumption hold true? [Narrative response]				
		Comment on assumption [Narrative response – offer any thoughts on changes, upcoming events or indicators which are anticipated to verify this assumption]				
Risk: <i>Uneven distribution of economic development could generate further destabilising elements.</i>		Has the likelihood of this risk increased or decreased? [Narrative response with supporting examples]				
		Has the impact of this risk increased or decreased? [Narrative response]				
Measure of Effect		Criteria	Rating	Supporting data/ examples	Source of data	Reliability of data
1.1						
1.2						
1.3						

Figure 6: Example of Measures of Effectiveness, Assumptions and Risks Response Template seeking input to Campaign Assessment.

As shown above, those who provide input into campaign assessments by filling out the template¹⁷, were requested to make an assessment of whether each assumption continued to be true, or whether it had been disproven during the reporting period. Similarly, an assessment is sought from each respondent on whether the likelihood or impact of risks identified for each Effect have increased or decreased during the reporting period.

Another aspect to using the LARF for reviewing evaluation indicators is the validation of MoEs based on how they align with the macro-theory logic for each Effect. When the logic of how each Effect was expected to bring about change was stated in plain, active language in the LARF, this allowed the research team to check whether each MoE was genuinely linked to that logic. In some instances, it became apparent that a MoE was measuring indicators that did not have strong causal links to the logic. This presented opportunities to refine, or replace

¹⁷ For Defence campaign assessments, respondents usually include representatives from each force element of deployed ADF headquarters, relevant Intelligence agency representatives, HQJOC Branch staff officers, Defence International Policy Division and other Government agency representatives.

MoEs, to ensure that assessment data being sought through the MoE template was carefully targeted and relevant.

6 Findings from Trial Applications of the LARF

The preceding Chapters have established, through both theoretical research and practical experience, that effective campaign planning and evaluation requires a process for systematically identifying and analysing critical information requirements; namely the logic, assumptions and risks. The LARF is designed to achieve this, and its viability has been tested through a series of trials on current ADF critical campaign functions. We are now able to reflect on these trials and conclude whether it has been a genuine enhancement to existing Defence operational planning and evaluation processes, and whether it can offer additional benefit with additional research and development. This will be done by revisiting the initial aims of the research, and also determining whether the framework meets the practicality criteria. Finally, recommendations will be made on the suitability of the LARF for other applications, and what research may be undertaken to further develop, validate and adapt the LARF to be of benefit in other domains.

6.1 Outcomes of Trials

Each of the four trials of the LARF detailed in the previous chapter are considered to have been successful. In each instance, the LARF was easy to use and not arduous for participants. In each instance the LARF process yielded insights and information outputs that were not previously apparent. The specific value derived from the application of the LARF as evidenced in the various trials is discussed below.

Application of the LARF to the initial planning phase of the Regional Campaign Plan demonstrated that it provides a documented structure which enables planners to demonstrate rigorous, comprehensive consideration of all necessary variables. This in turn enables transparent validation of the scope of the draft plan, and the scale of its objectives, logic and planned actions. During the early planning phase, the LARF workshop was also observed to provide momentum and clarity for planners who are attempting to navigate their way through the synthesis of a broad number of complex variables into a single cohesive plan.

It was found in both the initial planning trial and the planning review trial, that population of the LARF matrix creates a shared reference for gaining consensus and capturing the cognitive map behind planning decisions, prompting participants to justify their version of logic as being derived from senior directives, or relevant experience. It also helps resolve disagreements over some statements of logic, where participants can agree as long as a number of associated risks are noted in the LARF, and subsequently in the draft plan, for on-going monitoring.

The LARF is also effective in bringing into question the viability of some campaign plan objectives and effects, by revealing those for which there is no clear logic, or those that rest on excessive assumptions or risks. As a result, during the initial planning trial and the planning

review trial, a number of Effects were re-drafted, or moved to contribute to the achievement of a different Objective. Duplications in logic, or the apparent risk of high degrees of interdependency, also highlighted the need to merge or delete overlapping Effects in both trials.

For operational evaluation, the LARF can make a significant contribution to the identification and verification of indicators and metrics. This is evidenced by the product of the initial planning trial, which was a matrix populated with revised Effects and grouping of Objectives, detail on the logic, assumptions and risks for each component of the plan, and narrative summaries of the overarching threads of logic, and the primary assumptions and risks of the plan. This level of detail enables evaluators to better interpret high level intent into visible scenarios, for which milestones and indicators of success can be nominated. This was reinforced during the generation of indicators for assessment trial, where the level of detail provided by the LARF generated micro-ToC, which were then able to be used to verify the existing MoE set. The process also resulted generated a set of assumptions and risks to be monitored in addition to the MoE set, which provided evaluators with tangible indicators of whether an MoE had become redundant, or was at risk of not being achieved.

In each trial, it became evident that the LARF contributed to a broader understanding of the operational context, including recognition of opportunities and risks related to other Government agency involvement in the region. This is likely to facilitate more effective inter-agency communications where a Whole of Government or multi-agency response is required. During the continual situational awareness trial, benefit was observed as the expanded knowledge of the participants led to discussion of new information requirements, and consideration of information sources. Further benefit was demonstrated in the planning review trial, during which re-framing the plan in the LARF format prompted participants to view the plan in the context of the current and likely future operating environment, instead of viewing it as a static structure with insulated internal logic. This in turn increased consideration of the role of other Government agencies, and what communication may need to occur with them.

The process of populating the LARF is particularly valuable for enhancing participant's understanding, engagement and may improve the mental model they take forward as planners or evaluators. As demonstrated during all of the four trials, the LARF prompts planners / assessors to consider sequencing, temporality, linkages, and interdependencies. For example, during the generation of assessment indicators trial, participants were inspired to consider the feedback loops which exist between action and consequence in direct or indirect ways, which led to emergence of a greater range of potential MoEs. During the same trial, it also encouraged participants to look for indicators of the opposite state of achievement of an Effect (i.e. what we don't want to see) and what direct and indirect action may be a precursor to that undesired state coming about.

One of the unintentional benefits of the LARF is that it provides an option for a constructive task orientation / team development activity. This emerged as a result of the continuous situational awareness trial. In this instance, the LARF demonstrated its potential value for overcoming the challenge of establishing a team across organisations, where the extent or concept of suitable knowledge or situational awareness, is not understood. Here, the LARF

offers a task-oriented mechanism for base-lining, developing and sharing knowledge at the initiation of a task.

6.2 Satisfaction of Aims and Practicality Criteria

As a result of the trial outcomes summarised above, it is possible to make an assessment that each of the three research aims defined in Section 1.2, have been met. Firstly, the aim of highlighting the priority information components of a plan that enable CA, has been met by identifying the three information elements that are critical to enhancing understanding of campaign plans. As suggested in the definition of the Defence CA context, confirmed by the literature review, and as demonstrated during the LARF trials, visibility of the logic, assumptions and risks are a significant enabler for effective and accurate CA. These information elements are considered most effective in reducing the abstract nature of goals/effects by prompting visualisation of what they will look like in practice. In the simplest terms, drawing out logic, assumptions and risks allows us to break down strategic or operational objectives into 'stories' of how they are expected to be achieved, facilitating accurate prioritisation of activities and identification of indicators of progress.

The second aim of investigating whether it is possible to develop a framework that can be applied to the CA process to draw out the information components that have been identified as priorities, has been comprehensively achieved. The LARF fills a methodological gap in making explicit the logic links between elements of a plan, and surfacing underpinning assumptions and risks. In the past we have identified and monitored risks and assumptions to be included in evaluations essentially via brainstorming. But the LARF enables us to do this systematically with some assurance of comprehensive consideration across all components of the plan. It then enables aggregation of those assumptions and risks and visibility of any primary risks that are common across multiple Effects, which can be highlighted and prioritised for monitoring or prevention.

The third aim has also clearly been achieved; namely consideration of whether the framework can be applied to drafting of new plans and reviews of existing ones, so that priority information components are clearly articulated in future plans. The LARF has been trialled as a mechanism for facilitating the drafting of a plan and in the review of an existing plan. In both instances, it was successful, and easily implemented within existing ADF planning and review processes. As detailed in Section 6.1 above, there are multiple benefits of applying the LARF in these ways, including the creation of a watch-list of assumptions and risks for periodic review as a systematic means of updating long term plans.

The realisation of these benefits in practice, has met the aims of the research, but as determined in the research method, the quality of the LARF as a practical solution is contingent on the framework meeting six practicality criteria for useability and suitability for the Defence operational environment. The LARF is assessed against each criterion as follows:

1. Have clear and cohesive outputs, and
2. Be easy to summarise into a variety of different formats (ie. summary table; narratives for briefs or reports, key categories for information requests or existing evaluation templates).

The LARF has clear immediate and subsequent outputs, starting with a populated matrix of critical information requirements for use in planning and evaluation. As practical applications have demonstrated, the information contained in this matrix can be summarised or expanded upon for a variety of purposes, ranging from cells added within the matrix briefly summarising key issues (See Figure 5), to extraction into existing evaluation frameworks (See Figure 6), to full narrative extrapolations of the categories of information discussed (described under 5.1).

3. Have a natural flow that does not have participants slavishly stepping through disconnected components.

While the framework can be populated from left to right and its components are interdependent, it can also be populated in a different order, depending on the knowledge and preference of participants. Practical applications have shown that the interdependence of logic, assumptions and risk components gives rise to a natural flow of information, regardless of the order in which they are considered (as discussed under 5.2). Also, the matrix does not require equal quantities of information to be drawn out for each component in order for it to be effective. The fact that information may not be available for a particular aspect of a plan, can simply be noted in the matrix as an insight, and need not hinder the LARF process.

4. Be flexible and scalable enough to allow extra time or emphasis to be given to different steps, in response to participant preferences,

The LARF has been developed as a scalable framework that allows users to choose which level of a plan they wish to take as the start point for review, and which levels they are going to take as 'set in stone'. This was in response to the fact that there are variations in the extent to which plans or evaluation frameworks can be altered, in different DSTO support tasks. This has been achieved by considering options for labels of each column of the LARF matrix which are useful for devising elements of a plan from first principles, but which were equally well suited to categorising elements of any level of an existing plan. Users of the framework can then choose to review a plan by considering the logic, assumptions and risks of its highest level premise; or they may not wish to review the higher levels of a plan, and choose to consider the logic assumptions and risks associated with lower level effects and tasks.

As revealed in the literature review, both ToC and program theory allow for either micro- or macro- theories to be drawn out and analysed. By synthesising ToC into the LARF, we are able to use it to gain insight into either the detail of how activities and component parts of a plan are expected to work (ie. the micro-theory), or to gain insight into how the sum of the components is assumed to culminate in the achievement of some form of change (ie. macro-theory).

5. Be rapidly executable start to finish, without prior knowledge of underpinning theory or techniques, and
6. If necessary, be executable without any investment of resources and minimal staffing.

The benefits of LARF have been observed across a diverse spectrum of planning and evaluation phases, for operations of very different scale and context. One of the greatest

consistent benefits has been that it can be applied rapidly. This makes the framework highly practical for use in different environments, with variable numbers of participants; either as a total workshop, or as one of several steps in a larger activity. For example, as suggested in the initial planning trial, the framework could be used to give structure to a whole of Government planning forum. Or, as proposed in the planning review trial, the LARF can be quickly applied by a plan's users at the tactical level, to identify and summarise any concerns they have with a plan going forward. This provides a more effective and constructive form of communication than voicing general dissatisfaction, or relying on a single point of contact to accurately capture and convey concerns. The option defining the level of focus at the start of a LARF workshop, as either macro- or micro-theory (or a combination of both) encourages participants to actively decide on their aims, rather than meandering between strategic and detailed focus as the discussion progresses.

6.3 Limitations

Despite the achievement of the research aims and the clear success of the LARF trials, there are a number of limitations to this research which should be noted in conjunction with its findings.

Most notably, due to the direct operational support environment in which the LARF has been developed and tested, the research has been subject to time constraints and inability to conduct empirical testing and validation. The LARF has been trialled on a variety of tasks, as opportunities arose. Therefore, the duration, scale, selection of participants, recording of data and assessment of LARF workshops has been limited to what is possible without infringing on other operational tasking. This means that formal assessment using pre-determined validation criteria within a controlled experimental trial has not occurred.

The information elicited from participants for the LARF is at this stage an improvement on unstructured group discussion and opportunistic data collection. However, the means by which participant inputs are captured, documented and interpreted are the result of limited research. It is recognised that the LARF would benefit from incorporation of expertise in a range of research fields related to participative research and qualitative data capture.

Limitations should be acknowledged in the suitability of the LARF as *the* solution for all planning and evaluation challenges. It is intended to be *a* solution for a specific set of requirements, and use in other contexts may require adaptation and reconsideration of the critical information categories included in the matrix. The LARF is a framework for the application of a number of theories to the Australian Defence operational context, and while it was well suited to the practical trials described above, as with any technique, it has potential to be used in contexts, or for purposes that are not viable. Also, while it has the potential to provide greater clarity and transparency on goals and indicators of future progress, it does not enable them to be reduced to some form of quantifiable formula for success. It is designed to reveal and analyse current mental models, and not to predict likely future likely sequences of events. The data used to populate the framework remains the subjective view of LARF participants. Making these views transparent is a first step in making them easier to analyse and verify, but categorising them in the LARF does not automatically make them authoritative or more accurate.

6.4 Future Work

In order to address a number of the limitations noted above, and to continue to develop the LARF as an enhancement to planning and evaluation, a number of priority areas for future work are proposed.

There is further work to be done in exploring other potential applications of the framework, including large scale exercises and benchmarking internationally, across a variety of research disciplines, and agencies, to learn from the employment of similar approaches. One of the focus points for comparison would be how its outcomes can be communicated to decision makers to achieve optimal effect. Lessons could then be learned about the optimisation of the LARF and the format of its outputs for Defence decision making.

Two of the six critical campaign functions highlighted in Section 3.2, have not yet been trialled as options for application of the LARF. Specifically, the LARF is yet to be applied as part of a program completion process or post-operation evaluation, but given its demonstrated utility in fleshing out operational goals and the assumptions of what success will look like, the potential for its application is clear. For those operations where the LARF has been integrated into early planning or monitoring, it is expected that the framework will be referred to when gathering evidence to determine when an operation will be complete. It is also expected that the detail provided by LARF for those same operations will be drawn upon for post-operational evaluation and lessons capture to articulate whether in hindsight, operational goals were in fact achieved, whether planning logic and assumptions were flawed, and the degree to which risks were accurately identified and mitigated. This hypothesis is an extension of ToC where it is proposed that having stated how a program's activities were expected to play out and combine to achieve objectives, we have greater clarity in hindsight to ascertain why a plan or activity succeeded or failed. Within program theory, the use of LARF for this purpose would fulfil the Learning Events component, as shown in Figure 4 above. As the large-scale ADF roles in Afghanistan, East Timor and the Solomon Islands draw to an end in coming years, the value of the insights provided by the LARF for withdrawal planning and post-operation evaluation is likely to become apparent.

Should the LARF process be more widely used, there is also further work to be done in incorporating relevant aspects of the LARF process in the development of doctrine, and various forms of guidance on planning, and evaluation. Ideally, future work would also include a greater breadth of benchmarking to learn whether similar approaches have been used in other problem domains, and how lessons from these may improve the LARF.

Further work is recommended to subjecting the LARF to formal controlled experimental trialling, with assessment using pre-determined validation criteria. This may include controlled trial validation to more clearly assess benefits gained by applying the LARF, including seeking formal feedback from users, and subsequent decision makers. As a priority, further investigation would be desirable on mechanisms for elicitation of data from groups and individuals to populate the framework, and techniques for monitoring the validity of such inputs. Ideally future trials would include an independent assessor to record process observations, including limitations and weaknesses.

7 Conclusion

The LARF was conceived as a checklist for drawing out the types of information that have been identified as essential for operational-level planning and evaluation in Defence. The mechanisms for drawing out and using this information within the LARF have been drawn from a range of theories widely used in decision support and evaluation practice outside of Defence.

This research has been successful in establishing sufficient theoretical knowledge, to combined with practical experience of Defence's planning and evaluation requirements, to develop a viable framework. Application of the LARF in a variety of trials has demonstrated that it has achieved the research aims. Specifically, the LARF provides a mechanism for increasing overall understanding of the components of the campaign plan and the plan's comprehensiveness, cohesiveness and context. It provides a framework for a way of thinking, that prompts planners to ask certain questions and requires the articulation of answers in a certain way. It provides guidance for scientifically considering a problem, and provides the techniques for applying that mental model throughout the steps of planning and evaluation. This has been confirmed in its use as an exercise to increase team situational awareness in preparation for a CA cycles, and as a tool for highlighting gaps and flaws for prioritisation as part of revision of an operational plan.

In all of the trials, the LARF proved effective in reducing the abstract nature of goals and effects by prompting visualisation of what they will look like in practice. This was particularly valuable during drafting of a new plan, as it facilitated extrapolation of broad intent into more tangible goals. This enabled planners to more constructively debate the achievability of goals, and to identify overlaps or contradictions amongst them. Similarly, the LARF was of benefit in plan drafting as a mechanism for systematically working through the plan, indentifying what progress in each of its elements is expected to look like, and what would indicate a risk to that progress. This benefit was also experienced in the other trials, especially when attempting to generate a set of MOEs, which requires systematic visualisation of each element of the plan to identify what the visible indicators of progress are likely to be.

Both DSTO researchers and Defence participants in LARF workshops have confirmed its utility in providing a check-list of questions and factors to consider during planning, monitoring and evaluation to improve the consistency of translation of strategic intent from planning, through execution, to completion of operations. This was particularly evident during trials for a draft plan and for revision of an existing plan.

There remains significant scope for further development, validation and application of the LARF, particularly in the use of data elicited in the LARF matrix as a reference for tracking whether planning logic and assumptions were correct as part of post-operational evaluations. However, research to date has produced a practical and immediately applicable framework, as confirmed by satisfaction of the practicality criteria. The adaptability of the LARF and its suitability for being employed rapidly, without a significant resource liability, makes the LARF well-suited to meeting current Defence planning and evaluation requirements, and it is simple and practical enough to be adapted for a wide variety of future functions.

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19. ABSTRACT This report documents the development and application of the Logic, Assumptions and Risks Framework (LARF) by DSTO, in an effort to establish a mechanism to improve the transparency of the decision paths that underpin planning and evaluation. The challenge was to develop an approach that draws from established planning and evaluation theory, but is tailored for Defence-specific requirements, specifically for use in campaign planning and assessment activities. This framework has been trialled and validated in a range of practical scenarios and has proven to be effective. Consequently, it is assessed as being well-suited to the current and future Defence decision-making environment, and is likely to continue to be applied as part of DSTO's support.							